

tools shall not be used against the concrete in removing the forms. Any concrete found defective after form removal shall be promptly and satisfactorily repaired. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

11.1 Sidewalks: Forms for sidewalks shall be set with the upper edge true to line and grade with an allowable tolerance of 1/8 inch in any 10 foot long section. After forms are set, grade and alignment shall be checked with a 10-foot straightedge. When placed against the concrete curb and gutter, forms shall have a transverse slope of 1/4 inch per foot with the low side adjacent to the roadway. Side forms shall not be removed for 12 hours after finishing has been completed.

11.2 Curbs and Gutters: Forms shall be set straight to proper line and grade and shall be checked with a 10 foot straight edge prior to placing concrete. The forms of the front of the curb shall be removed not less than 2 hours nor more than 6 hours after the concrete has been placed. Forms at back of the curb shall remain in place until the face and top of the curb have been finished as specified for concrete finishing. Curb and gutter forms shall not be removed while the concrete is sufficiently plastic to slump in any direction.

11.3 Valley Gutters: Forms shall be set straight to proper line and grade and shall be checked with a 10 foot straight edge prior to placing concrete. The forms shall be removed so as not to injure the concrete, and shall not be removed while the concrete is sufficiently plastic to slump in any direction.

## 12. SIDEWALK CONCRETE PLACEMENT AND FINISHING:

12.1 Formed Sidewalks: Concrete shall be placed in the forms in one layer of such thickness that when consolidated and finished the sidewalks will be of the thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be consolidated with a wood float, bull float, or darby, edged and broom finished.

12.2 Concrete Finishing: After straightedging, when most of the water sheen has disappeared, and just before the concrete hardens, the surface shall be finished to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. A scored surface shall be produced by brooming with a fiber-bristle brush in a direction transverse to that of the traffic.

12.3 Edge and Joint Finishing: All slab edges, including those at formed joints, shall be finished carefully with an edger having a radius of 1/8 inch. Transverse joints shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with a properly proportioned mortar mixture and then finished.

12.4 Slip-Formed Sidewalks: Slip formed sidewalks will not be permitted.

12.5 Surface and Thickness Tolerances: Finished surfaces shall not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 0.25 inch.

### 13. CURB AND GUTTER AND VALLEY GUTTER CONCRETE PLACEMENT AND FINISHES:

13.1 Formed Curb and Gutter: Concrete shall be placed to the section required in a single lift. Consolidation shall be achieved by using approved mechanical vibrators.

13.2 Concrete Finishing: Exposed surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. Floated surfaces shall then be brushed with a fine-hair brush with longitudinal strokes. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until blemished, form marks, and tool marks have been removed. The front curb surface, while still wet, shall be brushed in the same manner as the gutter and curb top. The top surface of the gutter and entrance shall be finished to grade with a wood float.

13.3 Joint Finishing: Curb edges at formed joints shall be finished carefully with an edger having a radius of 1/8 inch.

13.4 Curb Forming Machine for Slip-Formed Curb and Gutter and Dowel-On Curb: Concrete shall be placed to the desired section in a single pass. When the paver approaches a header at the end of a paving segment, a sufficient amount of concrete shall be maintained ahead of the paver to allow a roll of concrete to spill over the header. The amount of extra concrete shall be sufficient to prevent the slurry that is formed and carried along ahead of the paver from being deposited adjacent to the header. The paver vibrators should be brought as close to the header as possible before they are lifted. Additional consolidation shall be provided by hand-manipulated vibrators when required. When the curb forming machine is operated between or adjacent to the previously constructed curbs, provisions shall be made to prevent damage to the previous construction and the machine. Finished surface at the edges shall not produce an edge slump exceeding 0.25 inch over 85 percent of the finished work and 100 percent of the work shall not have an edge slump exceeding 0.75 inch.

13.5 Surface and Thickness Tolerances: Finished surfaces shall not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 0.25 inch.

14. SIDEWALK JOINTS: Whenever possible, sidewalk joints shall be constructed to divide the surface into rectangular areas. Transverse construction joints shall be spaced at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and shall be continuous across the slab. Contraction joints shall be placed at ramps or odd shaped areas to prevent random cracking of the slab at

locations as required or directed. Transverse expansion joints shall be installed at sidewalk returns. Sidewalk shall not be installed in contact with the curb, longitudinal expansion joints shall be installed between sidewalk and curb and gutter. Expansion joints shall be formed about structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated.

14.1 Contraction Joints: The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab a depth of at least one-fourth of the sidewalk thickness, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8 inch blade to the depth indicated. An ample supply of saw blades shall be available on the job before concrete placement is started, and at least one standby sawing unit in good working order shall be available at the jobsite at all times during the sawing operations.

14.2 Expansion Joints: Expansion joints shall be formed with 1/2-inch joint filler strips. Joint filler shall be placed with top edge 1/4 inch below the surface and shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch. Expansion joint material shall be just below the finished sidewalk grade to prevent a tripping hazard. Expansion joints within sidewalks need not be sealed. Expansion joints between curb and gutter and sidewalk must be sealed only when "Form and Seal Expansion Joints" is specified.

15. CURB AND GUTTER AND VALLEY GUTTER JOINTS shall be constructed at right angles to the line of curb and gutter.

15.1 Contraction Joints: Contraction joints shall be spaced so that monolithic section between curb returns will not be less than 5 feet nor greater than 15 feet in length. Contraction joints shall be constructed by means of 1/8 inch thick separators of a section conforming to the cross section of the curb and gutter or valley gutter. Separators shall be removed prior to finishing and the joint shall be radiused with the edger tool. Contraction joints within curbs need not be sealed.

15.2 Expansion Joints: Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to cross section of curb and gutter or valley gutter. Joint filler shall be placed with top edge 1/4 inch below the surface and shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch. Where curb and gutter does not abut portland cement concrete, expansion joints at least 1/2 inch in width shall be provided at intervals not exceeding 60 feet. Expansion joints shall be provided with smooth load transfer dowels as shown on the plans. Only the expansion joint in the valley section of curb and gutter must be sealed, the expansion joint in the gutter section need not be sealed.

16. **TYING INTO EXISTING CURB AND GUTTER:** When curb and gutter is indicated to tie into existing curb and gutter to remain, the contractor shall cut the existing curb to a square face remove the curb shown to be demolished in accordance with SECTION: DEMOLITION. The contractor shall bore 1/2 inch into the existing curb to remain at least 6 inches and install two #4 load transfer dowel securely grouted into the holes. Load transfer dowels are required to minimize the effect of differential heave or settlement.

17. **HANDICAPPED ACCESS RAMPS:** When indicated on the plans or directed, the contractor shall install handicapped access ramps where sidewalk terminates or butts into curbs. Handicapped access ramps shall be constructed by dropping the curb height down to near the flow line elevation, depressing the sidewalk and tying to the curb as shown on the plans.

18. **COLOR MATCHING CONCRETE:** Color matching concrete shall be finished as specified for normal concrete. Color matching concrete will be required on new sidewalks and curbs where, in the opinion of the Government, color matching is desirable. Color matching material shall be mixed in at the time of finishing and the manufacturer's recommendations shall be followed. Color matching shall be used to ensure that new concrete sidewalks and/or curbs in selected locations closely match the color of existing sidewalks and/or curbs immediately adjacent.

19. **POWER WASHING CONCRETE:** Power washing concrete shall be used in conjunction with color matching concrete and shall be used to remove ground in dirt and stains from the concrete by the application of high-pressure water and soap. Existing sidewalks and/or curbs shall be power washed prior to replacement of adjacent section to reveal the true color of the existing concrete in order that a good match can be obtained. Extent of power washing will be as specified.

20. **FILING AND BACKFILLING:** After curing, debris shall be removed and the area adjoining the concrete shall be filled and backfilled, graded, compacted and seeded to conform to the surrounding areas with no dips or low areas to hold standing water. Filling or backfilling shall be accordance with SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE. Seeding shall be in accordance with SECTION: ESTABLISHMENT OF TURF.

21. **PROTECTION:** Completed concrete shall be protected from damage until accepted. The contractor shall repair damaged concrete and clean concrete discolored during construction.

22. **ACCEPTANCE TESTING:**

22.1 **Grade Conformance Tests:** If directed, completed sidewalks, curb and gutter, and valley gutter sections may be checked for conformance with plan grade requirements. Should checking of grades be required, the completed section will be subdivided into segments of length such as a 300-foot section. The finished surface of sidewalks shall be tested by running a line of levels at intervals of 25 feet or less,

longitudinally along the centerline. Curb and gutter sections shall be tested by running line of levels at 25-foot intervals or less. Elevations shall be recorded for face of curb/flow line of gutter, and valley gutter. The levels required will be run by the contractor. Within 30 days after completion of concrete placement in the respective area, the contractor will furnish a copy of the level notes to the Contracting Officer, and identify in writing, all areas defective in plan grade requirements. No pavement shall be placed adjacent to a defective curb and gutter until such time as the defect is corrected.

**22.2 Surface Smoothness Determination:** If directed, the surface of the completed section shall be tested, by the contractor, in the presence of the Contracting Officer, with a 10-foot straightedge or other approved device, operated in such a manner as to reveal all surface irregularities exceeding the specified tolerances. Testing shall be conducted after the concrete has hardened sufficiently to permit walking thereon, but no later than 36 hours after placement. The entire area of sidewalks shall be tested in both the longitudinal and the transverse direction on longitudinal parallel lines 3 feet apart or less and transverse lines 10 feet apart or less. Curb and gutter shall be tested in the longitudinal direction along the center of the gutter and top of curb. The straightedge shall be held in contact with the surface and moved ahead 1/2 the length of the straightedge for each successive measurement. Straightedge lines shall be carried continuously across joints. The height of high areas on pavement surfaces shall be determined by placing the center of the straightedge at the center of high areas, rocking the straightedge until one end comes in contact with the pavement, then measuring the distance between the pavement surface and the bottom of the straightedge at the opposite end, and taking one-half the distance as the height of the high area. Other devices that reveal surface irregularities exceeding specified tolerances may be used when approved.

**22.3 Edge Slump Determination:** If directed, the surface shall be tested with a 10-foot straightedge or other approved device to reveal irregularities exceeding the edge slump requirements. Testing shall be conducted after the concrete has hardened sufficiently to permit walking thereon. The edge slump shall be determined at each edge of each sidewalk or curb and gutter constructed. Measurements shall be made at 5- to 25-foot spacing commencing at the header where paving is initiated. The measurements shall be made by the contractor, in the presence of the Contracting Officer, and will be properly referenced in accordance with established paving lane identification of the adjacent pavement and stationing.

**22.4 Thickness Evaluation:** The anticipated thickness of the concrete shall be determined prior to placement by passing a template through the formed section or by measuring the depth of opening of the extrusion template of the curb forming machine.

**22.5 Surface Evaluation:** The finished surface of each category of the completed work shall be uniform in color and free of blemished and form or tool marks.

### **23. SURFACE DEFICIENCIES AND CORRECTIONS:**

23.1 Thickness Deficiency: When measurements indicate that the completed concrete section is deficient in thickness by more than 0.25 inch the deficient section will be removed, between regularly scheduled joints, and replaced.

23.2 High Areas: In areas not meeting surface smoothness or plan grade requirements, high areas shall be reduced either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. Correction shall be made at no additional cost to the Government. The area corrected by grinding the surface shall not exceed 5 percent of the area of any integral slab and the depth of grinding shall not exceed 1/4 inch. All pavement areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replace at no additional cost to the Government.

23.3 Excessive Edge Slump: High areas revealed by the edge slump measurements will be subject to the tolerances specified. The concrete within the limits of excessive edge slump will be removed and replaced at no additional cost to the Government. Partial slabs removed and replaced shall extend across the full width of the section.

23.4 Appearance: Exposed surface of the finished work will be inspected by the Government and any deficiencies in appearance will be identified. Areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work shall be removed and replaced at no additional cost to the Government. When concrete color matching is specified and the finished product is, in the opinion of the Contracting Officer, not a satisfactory color match, those areas of concrete curb and gutter or sidewalk showing unsatisfactory color matching shall be removed and replaced at no additional cost to the Government.

## SECTION 16A

### ELECTRICAL REQUIREMENTS

#### PART 1 - GENERAL

1. APPLICABLE PUBLICATIONS: The publications listed below, form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society for Testing and Materials (ASTM) Publications:

D 1785 REV A-96	1996	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
F 512-95	1995	Smooth-Wall Poly (Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation

1.2 National Electrical Manufacturers Association (NEMA) Publications:

TC 6-90	1990	PVC and ABS Plastic Utilities Duct for Underground Installation
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1.3 American National Standards Institute (ANSI) Publication:

C2-97	1997	National Electrical Safety Code
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1.4 National Fire Protection Association (NFPA) Publication:

70-96	1996	National Electric Code, 1996 edition, and Errata #1
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2. GENERAL REQUIREMENTS: Materials and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product two (2) years prior to bid opening.

2.1 Code Compliance: All electrical work and installation shall comply with the requirements and recommendations of NFPA 70, National Electrical Code and ANSI C2 National Electrical Safety Code.

2.2 Scope:

2.2.1 The scope of electrical lighting work shall be limited to that necessary to provide lighting to roadways or parking lots when deemed necessary by the Government. Electrical lighting work will always be in conjunction with paving or

repaving work, but unless agreeable to both the Government and the contractor, the cost of electrical lighting work shall not exceed 5% of the total Task Order cost.

2.2.2 The scope of electrical traffic loop work shall not be limited and shall be provided as deemed necessary by the Government.

2.2.3 The scope of electrical tie-down installation work (coring and boring and tie-down rods) shall not be limited except that the minimum order for tie-downs and coring and boring is 15 each and tie-down installation and coring and boring will always be ordered in increments of 15 EA.

2.2.4 The scope of utility duct installation work shall not be limited and shall be provided as deemed necessary by the Government. Utility duct installation will usually be required to provide empty duct banks for future utilities to cross under pavements and they will normally be installed in cut trenches during major pavement work and in bored holes at other times.

3. SUBMITTALS: Prior to the use of materials, cut sheets showing the equipment and material proposed for use shall be submitted for approval. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the materials, printed copies of these recommendations shall be furnished prior to use on the project.

#### 4. EQUIPMENT:

4.1 Chain Trenching Equipment: Chain trenching equipment shall be well maintained and shall be self-propelled and of sufficient size to perform the intended task.

4.2 Lighting Pole Foundation Boring Equipment: Lighting pole foundation boring equipment shall be well maintained and shall be truck mounted and of sufficient size to perform the intended task.

4.3 Concrete Coring and Boring Equipment: Concrete coring and boring equipment shall be well maintained and shall be of sufficient size and design to perform the intended task.

4.4 Pavement Boring Equipment: Pavement boring equipment shall be well maintained and shall be of sufficient size and design to perform the intended task. Pavement boring equipment shall be specially designed to bore under pavements in preparation for empty duct installation.

5. DELIVERY AND STORAGE: Materials delivered to the site shall be inspected for damage, unloaded and stored with a minimum of handling. Materials shall be handled in such a manner as to insure materials are not damaged.

#### 6. MEASUREMENT:

6.1 Lighting Poles:



6.1.1 Single Arm Lighting Poles: The quantity of single arm lighting poles to be paid for will be the negotiated number of single arm lighting poles, including accessories, anchoring hardware, and foundation hole boring, as stated in the Task Order.

6.1.2 Twin Arm Lighting Poles: The quantity of twin arm lighting poles to be paid for will be the negotiated number of twin arm lighting poles, including accessories, anchoring hardware, and foundation hole boring, as stated in the Task Order.

6.2 Luminaires: The quantity of luminaires to be paid for will be the negotiated number of luminaires for installation on lighting poles, including accessories, one lamp for each luminaire, and miscellaneous hardware, as stated in the Task Order.

6.3 Remove and Reinstall Existing Government Lighting Poles: The quantity of remove and reinstall existing Government lighting poles to be paid for will be the negotiated number of remove and reinstall existing Government lighting poles, including hole boring for non-anchor base poles or for setting anchor base poles on new or existing foundations, as stated in the Task Order.

6.4 Grounding Rod and Clamp: The quantity of grounding rod and clamp to be paid for will be the negotiated number of grounding rod and clamp for use with lighting poles, as stated in the Task Order.

6.5 One (1) Inch Electrical Conduit: The quantity of One (1) inch electrical conduit to be paid for will be negotiated number of linear feet of one (1) inch Schedule 40 electrical conduit for use in electrical lighting work, including fittings and sweeps, as stated in the Task Order.

6.6 Wiring for Electrical Lighting Circuits: The quantity of wiring for electrical lighting circuits to be paid for will be negotiated number of linear feet of each size of electrical wiring installed in conduit for use in electrical lighting work, including connectors, as stated in the Task Order.

6.7 Pullboxes: The quantity of pullboxes to be paid for will be negotiated number of pullboxes for use in electrical lighting work, as stated in the Task Order.

6.8 Traffic Loop Wire: The quantity of traffic loop wire to be paid for will be negotiated number of linear feet of traffic loop wire for use in traffic loops, as stated in the Task Order. "Saw and Seal Detail "A"" will be used for sawing and sealing loops and is a separate bit item.

6.9 Connection of Traffic Loop to Signal at Government Pullbox: The quantity of connection of traffic loop at Government pullbox to be paid for will be negotiated number of connection to traffic loop signal at Government pullbox, as stated in the Task Order.

6.10 Chain Trenching:

6.10.1 Chain Trenching for Conduits  $\leq 2$ " Diameter: The quantity of chain trenching for conduits  $\leq 2$ " diameter to be paid for will be negotiated number of linear feet of chain trenching for conduits  $\leq 2$ " diameter for use in electrical lighting or ductbank work, as stated in the Task Order.

6.10.2 Chain Trenching for Conduits  $> 2$ " and  $\leq 4$ " Diameter: The quantity of chain trenching for conduits  $> 2$ " and  $\leq 4$ " diameter to be paid for will be negotiated number of linear feet of chain trenching for conduits  $> 2$ " and  $\leq 4$ " diameter for use in ductbank work, as stated in the Task Order.

6.11 Aircraft Tie-Down Rods: The quantity of aircraft tie-down rods to be paid for will be negotiated number of aircraft tie-down rods, as stated in the Task Order.

6.12 Concrete Pavement Coring and Boring: The quantity of concrete pavement coring and boring to be paid for will be the negotiated number of concrete pavement coring and boring for installation of aircraft tie-downs, as stated in the Task Order.

#### 6.13 Utility Duct:

6.13.1 Type EB Utility Duct: The quantity of Type EB utility duct conduit to be paid for will be the negotiated number of linear feet of 4 inch nominal size Type EB utility duct conduit for use in ductbank work, including accessories, as stated in the Task Order.

6.13.2 Type DB Utility Duct: The quantity of Type DB utility duct conduit to be paid for will be the negotiated number of linear feet of 4 inch nominal size Type DB utility duct conduit for use in ductbank work, including accessories, as stated in the Task Order..

6.13.3 Schedule 40 Utility Duct: The quantity of Schedule 40 utility duct conduit to be paid for will be the negotiated number of linear feet of each size of Schedule 40 utility duct conduit for use in electrical or ductbank work, including accessories, as stated in the Task Order.

6.13.4 Pavement Boring: The quantity of pavement boring to be paid for will be the negotiated number of linear feet of each size of pavement boring under pavements in preparation for empty utility duct conduit installation, as stated in the Task Order. Excavation and backfilling of pits and installation of duct conduit are separate bid items.

6.14 Borrow: Measurement of borrow for use in ductbank installation will be made in accordance with the appropriate measurement clause "Borrow For Use As Select Fill", "Borrow For Use As Topsoil Fill", or "Borrow For Use As Earthen Fill" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

6.15 Fill: Measurement of fill for ductbank installation will be made in accordance with the measurement clause "Placing Fill and Backfill" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

6.16 Backfill: Measurement of backfill for use in ductbank installation, other than that placed in trenches dug by chain trencher, to be paid for will be determined in accordance with the measurement clause "Placing Fill and Backfill" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

6.17 Excavation: Measurement of excavation for use in ductbank installation, other than that excavated by chain trencher, will be made in accordance with the measurement clause "Excavation" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

6.18 Concrete:

6.18.1 Lighting Pole Foundations: Measurement of concrete used in lighting pole foundations will be made in accordance with the measurement clause "Miscellaneous Concrete Structures" contained in SECTION: CONCRETE, GENERAL REQUIREMENTS.

6.18.2 Ductbanks: Measurement of concrete for use in concrete encased ductbanks will be made in accordance with the measurement clause "Concrete Pavement" contained in SECTION: CONCRETE, PAVEMENT.

6.19 Flowable to be paid Fill: Measurement of flowable fill for use in conduit or ductbank installation will be made in accordance with the measurement clause "Flowable Fill" contained in SECTION: CONCRETE, GENERAL REQUIREMENTS.

6.20 Reinforcing Steel: Measurement of reinforcing steel for use in concrete lighting pole foundations will be made in accordance with the measurement clause "Reinforcing Steel" contained in SECTION: CONCRETE, GENERAL REQUIREMENTS.

6.21 Establishment of Turf: Measurement of establishment of turf for use in electrical work will be made in accordance with one of the "Establishment of Turf" measurement clauses contained in SECTION: ESTABLISHMENT OF TURF.

7. BASIS FOR PAYMENT:

7.1 Lighting Poles:

7.1.1 Single Arm Lighting Poles: Payment for the quantity of single arm lighting poles determined as specified above will be made at the contract unit price per each as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.1.2 Twin Arm Lighting Poles: Payment for the quantity of twin arm lighting poles determined as specified above will be made at the contract unit price per each as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.2 Luminaires: Payment for the quantity of luminaires determined as specified above will be made at the contract unit price per each as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials, one lamp for each laminar, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.3 Remove and Reinstall Existing Government Lighting Poles: Payment for the quantity of remove and reinstall existing Government lighting poles determined as specified above will be made at the contract unit price per each as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials if necessary, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.4 Grounding Rod and Clamp: Payment for the quantity of grounding rod and clamp determined as specified above will be made at the contract unit price per each as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.5 1 Inch Electrical Conduit: Payment for the quantity of 1 inch electrical conduit determined as specified above will be made at the contract unit price per linear foot as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.6 Wiring for Electrical Lighting Circuits: Payment for the quantity of wiring for electrical lighting circuits determined as specified above will be made at the appropriate contract unit price per linear foot for various wire sizes as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.7 Pullboxes: Payment for the quantity of pullboxes determined as specified above will be made at the contract unit price per each as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.8 Traffic Loop Wire: Payment for the quantity of traffic loop wire determined as specified above will be made at the contract unit price per linear foot as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work. "Saw and Seal Detail "A"" will be used for sawing and sealing loops and is a separate bit item.

7.9 Connection of Traffic Loop to Signal at Government Pullbox: Payment for the quantity of connection of traffic loop at Government pullbox determined as specified

above will be made at the contract unit price per each as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

#### 7.10 Chain Trenching:

7.10.1 Chain Trenching for Conduits  $\leq 2$ " Diameter: Payment for the quantity of chain trenching for conduits  $\leq 2$ " diameter determined as specified above will be made at the contract unit price per linear foot as established in the bid schedule for Roadway work. Such payment shall constitute full compensation for all labor, backfilling, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.10.2 Chain Trenching for Conduits  $> 2$ " and  $\leq 4$ " Diameter: Payment for the quantity of chain trenching for conduits  $> 2$ " and  $\leq 4$ " diameter determined as specified above will be made at the appropriate contract unit price per linear foot as established in the bid schedule for Airfield or Roadway work. Such payment shall constitute full compensation for all labor, backfilling, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.11 Aircraft Tie-Down Rods: Payment for the quantity of aircraft tie-down rods determined as specified above will be made at the appropriate contract unit price per each as established in the bid schedule for Airfield or Roadway work. Such payment shall constitute full compensation for all labor, materials, No. 761 form, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.12 Concrete Pavement Coring and Boring: Payment for the quantity of concrete pavement coring and boring for aircraft tie-down installation determined as specified above will be made at the appropriate contract unit price per each as established in the bid schedule for Airfield or Roadway work. Such payment shall constitute full compensation for all labor, materials, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

#### 7.13 Utility Duct:

7.13.1 Type EB Utility Duct: Payment for the quantity of Type EB utility duct conduit determined as specified above will be made at the appropriate contract unit price per linear foot as established in the bid schedule for Airfield or Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.13.2 Type DB Utility Duct: Payment for the quantity of Type DB utility duct conduit determined as specified above will be made at the appropriate contract unit price per linear foot as established in the bid schedule for Airfield or Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories,

equipment, overhead, profit, supervision, and incidentals necessary to complete the work

7.13.3 Schedule 40 Utility Duct: Payment for the quantity of Schedule 40 utility duct conduit determined as specified above will be made at the appropriate contract unit price per linear foot as established in the bid schedule for Airfield or Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.13.4 Pavement Boring: Payment for the quantity of pavement boring determined as specified above will be made at the appropriate contract unit price per linear foot of the appropriate size as established in the bid schedule for Airfield or Roadway work. Such payment shall constitute full compensation for all labor, materials, accessories, equipment, overhead, profit, supervision, and incidentals necessary to complete the work.

7.14 Borrow: Payment for the quantity of borrow used will be made in accordance with the appropriate payment clause "Borrow For Use As Select Fill", "Borrow For Use As Topsoil Fill", or "Borrow For Use As Earthen Fill" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

7.15 Fill: Payment for the quantity of fill used will be made in accordance with the payment clause "Placing Fill and Backfill" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

7.16 Backfill: Payment for the quantity of backfill used will be made in accordance with the payment clause "Placing Fill and Backfill" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

7.17 Excavation: Payment for the quantity of excavation used will be made in accordance with the payment clause "Excavation" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

7.18 Concrete:

7.18.1 Lighting Pole Foundations: Payment for the quantity of concrete used in lighting pole foundations will be made in accordance with the payment clause "Miscellaneous Concrete Structures" contained in SECTION: CONCRETE, GENERAL REQUIREMENTS.

7.18.2 Ductbanks: Payment for the quantity of concrete used in concrete encased ductbanks will be made in accordance with the payment clause "Concrete Pavement" contained in SECTION: CONCRETE, PAVEMENT.

7.19 Flowable Fill: Payment for the quantity of flowable fill used in conduit installation will be made in accordance with the payment clause "Flowable Fill" contained in SECTION: CONCRETE, GENERAL REQUIREMENTS.

7.20 Reinforcing Steel: Payment for the quantity of reinforcing steel used in concrete lighting pole foundations will be made in accordance with the payment clause "Reinforcing Steel" contained in SECTION: CONCRETE, GENERAL REQUIREMENTS.

7.21 Establishment of Turf: Payment for the quantity of establishment of turf used in electrical work will be made in accordance with one of the "Establishment of Turf" payment clauses contained in SECTION: ESTABLISHMENT OF TURF.

## PART 2 - PRODUCTS

### 8. LIGHTING ITEMS:

8.1 Lighting Poles: Lighting poles shall be either single arm or dual arm as required, spun aluminum monotube, as manufactured by the Union Metal Manufacturing Company, Canton, Ohio 44711, (212) 454-6111 or approved equal. Single arm poles shall be Union Metal No. 920-Y58 and twin arm poles shall be Union Metal No. 920-Y62. Poles are round anchor base type with nominal luminaire height being 25'-0". Anchor bolts and nuts shall be hot-dipped galvanized steel as recommended or provided by the manufacturer.

8.2 Luminaires: Luminaires for installation on lighting poles shall be 150 Watt high-pressure sodium, Part No. M2AR15SOH1GMS32, as manufactured by General Electric Lighting Systems, Hendersonville, NC 288739 or approved equal. Miscellaneous hardware shall be as recommended or provided by the luminaire manufacturer.

8.3 Grounding Rod and Clamp: Grounding rod shall be 5/8" X 8'-0" copper clad, No. 6358 as manufactured by Blackburn Division, 1525 Woodson Rd., St. Louis, Missouri, 63114, (314) 993-9430 or approved equal. Ground to ground wire clamp shall be No. JAB-58H as manufactured by Blackburn, or approved equal.

8.4 Electrical Conduit: Electrical conduit for use in underground applications shall be 1" nominal size Schedule 40 PVC conforming to ASTM D 1785.

8.5 Wiring for Electrical Lighting Circuits: Insulated wiring for electrical lighting circuits shall be copper conductor THWN. Uninsulated ground wire shall be bare copper. The Government will obtain prices for only those wire sizes listed in the bid schedule.

8.6 Pullbox: Pull boxes necessary for electrical lighting work shall be precast concrete No. 36T, as manufactured by Brooks Products, Inc. 2001 W. Mayfield Rd., Arlington Tx. (817) 467-2783.

8.7 Concrete: Concrete for lighting pole foundations shall be as specified in SECTION: CONCRETE, GENERAL REQUIREMENTS, 3,500 PSI strength.

8.8 Reinforcing Steel: Reinforcing Steel for lighting pole foundations shall be as specified in SECTION: CONCRETE, GENERAL REQUIREMENTS, sizes as indicated on the plans.

9. TRAFFIC LOOP ITEMS:

9.1 Traffic Loop Wire: Traffic loop wire shall be No. 14, insulated, XHHW.

9.2 Sealant: Pavement sealant for sealing loops shall be hot applied, non-jet-fuel resistant as specified in SECTION: JOINT AND CRACK SAWING, SEALING AND RESEALING IN PAVEMENTS.

10. AIRCRAFT TIE-DOWN ITEMS:

10.1 Aircraft Tie-Down Rods: Aircraft tie-down rods shall be 5/8" X 10'-0", copper bonded combination ground rod/tie-down No. 94-10TD, as manufactured by Robbins Lightning Protection Company, 124 East Second St., P.O. Box 440, Maryville, Missouri 64468, (816) 582-3156. Tie-down rods shall be complete with Robbins No. 761 plastic depression form.

10.2 Concrete: Concrete for tie-down installation shall be as specified in SECTION: CONCRETE, GENERAL REQUIREMENTS, 5,000 PSI strength.

10.3 Grout: Grout for tie-down installation shall be a combination of sand aggregate and portland cement based binder either formulated on the jobsite or commercially available. Grout shall be well suited for it's intended use and shall be subject to Government approval.

11. DUCTBANK ITEMS:

11.1 Concrete Encased Burial: Utility duct conduit for use in concrete encased burial applications shall be type EB, 90 degree C wire rated for underground use conforming to NEMA TC-6 and ASTM F-512. Type EB duct shall be nominal 4 inch diameter and have a wall thickness of not less than 0.082".

11.2 Direct Burial: Utility duct conduit for use in direct burial applications shall be either Schedule 40 PVC conforming to ASTM D 1785 or type DB, 90 degree C wire rated for underground use conforming to NEMA TC-6 and ASTM F-512 as directed. Schedule 40 PVC duct conduit shall be nominal 2 inch or 4 inch diameter. Type DB shall be nominal 4 inch diameter.

11.3 Utility Duct Accessories: Couplings, sweeps, and interlocking plastic duct spacer, plugs and other accessories necessary for a complete installation shall be the standard products of the duct conduit manufacturer.

11.4 Flowable Fill: Flowable fill for filling ductbanks under pavement shall be as specified in SECTION: CONCRETE, GENERAL REQUIREMENTS.



11.5 Concrete: Concrete for concrete encased ductbanks shall be as specified in SECTION: CONCRETE, GENERAL REQUIREMENTS, 3,500 PSI strength.

11.6 Bedding Material: Bedding material shall comply with paragraph "Borrow for Use As Select Fill" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

11.7 Topsoil Material: Topsoil material shall comply with paragraph "Borrow for Use As Topsoil Fill" contained in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE.

### PART 3 - EXECUTION

#### 12. LIGHTING POLE INSTALLATION:

12.1 Chain Trenching: Chain trenching shall be accomplished where indicated on the plans to the depth required by the National Electrical Code or indicated on the plans. Chain trenching for lighting pole installation shall be of sufficient width to accommodate a 1 inch diameter conduit. After conduit is installed and inspected, trenches shall be backfilled in well compacted lifts to prevent settling. Density testing for backfilling of chain trenching is not required, but the contractor will be responsible for continued filling as settling occurs in unpaved areas. Only flowable fill will be permitted for backfilling of trenches under paved areas.

12.2 Conduit: Conduit shall be installed in trenches with all fittings glued, well secured and inspected prior to backfilling. Joints in conduit shall be of the solvent cement type, using couplings when necessary, fabricated in accordance with the conduit manufacturer's recommendations.

12.3 Concrete Pole Foundations: Concrete shall be placed accurately in bored holes as indicated on the plans. Anchor bolts shall be provided and set as indicated on the plans. Reinforcing steel shall be provided and set as indicated on the plans. Conduit sweeps shall be provided and installed as indicated on the plans.

12.4 Wiring for Electrical Lighting Circuits: All wiring shall be pulled in conduit with no splices and shall be installed in accordance with the National Electrical Code. Wire sizes shall be as indicated on the plans.

12.5 Pullboxes: Pullboxes shall be provide where necessary subject to Government approval or where indicated on the plans. Pullboxes shall be set flush with the surrounding pavement or ground and well backfilled as appropriate.

12.6 Grounding Rod and clamp. Ground rod and clamp shall be installed as indicated on the plans.

12.7 Luminaires: Luminaires shall be installed on lighting poles without damage and shall be complete with the appropriate lamps, and tested. Luminaires installation shall be in accordance with the National Electrical Code.

12.8 Lighting Poles: The appropriate lighting pole, either single or twin arm shall be installed as indicated on the plans. Poles shall set plumb without damage. All accessories installed as provided. Handhold covers shall be secured. Anchor bolt nut covers shall be secured.

### 13. TRAFFIC LOOP INSTALLATION:

13.1 Traffic Loop Wire: Traffic loop wire shall be installed in joints sawn in the pavement. Sawed joints shall be blown completely clear of sawings, rocks, and other debris prior to installing wire. Wire shall be continuous and shall be run from the Government pullbox, circle the loop at least two, but as many as times as required and returned to the Government pullbox. Ensure sufficient wire remains in the pullbox to make connection to traffic light controller.

13.2 Sealant Installation: After traffic loop wire is installed in sawcuts, wire shall be sealed in place with the specified hot-poured sealant material. Sealant installation shall be flush with pavement surface and shall be in accordance with SECTION: JOINT AND CRACK SAWING, SEALING AND RESEALING IN PAVEMENTS.

13.3 Connection of Traffic Loop to Signal at Government Pullbox: After the traffic loop wire is installed in the roadway as required or as indicated on the plans, the loop shall be connected to the traffic signal at the Government pullbox. This work will normally be required when existing control loops are damaged or removed during pavement work.

### 14. AIRCRAFT TIE-DOWN INSTALLATION:

14.1 Pavement Coring: Existing concrete pavement shall be cored with a 6 inch diameter, power driven, diamond bit, concrete coring machine. Core holes shall extend completely through the concrete pavement. The contractor shall be prepared and, if necessary, shall core up to 21 inches of concrete at no additional cost to the Government. Every effort will be made to avoid reinforcing steel, but no additional payment will be made if reinforcing steel is encountered during concrete coring operations. Coring shall be accomplished so as not to unduly damage surrounding pavement to remain and any holes drilled to anchor the coring machine shall be filled to the Contracting Officer's satisfaction at no additional cost to the Government.

14.2 Core Removal: Prior to boring, concrete cores shall be removed and disposed of off the confines of the base. Core removal shall be accomplished so as not to unduly damage surrounding pavement to remain and any damage shall be repaired to the Contracting Officer's satisfaction at no additional cost to the Government. In areas subject to aircraft traffic, no cores shall be removed unless the contractor is prepared to totally complete the tie-down installation, including grouting, concrete installation and adequate curing time prior to the pavement being subjected to aircraft traffic.

14.3 Boring: After the cores are removed, the contractor shall bore into the underlying earthen material with a truck mounted auger to a depth sufficient to install

the tie-down: All earth brought to the surface shall be carefully removed. Water that enters shall be removed.

14.4 Tie-Down Installation: After the boring is completed, the contractor shall install the specified tie-down and grout it in place as indicated on the plans. Grout shall be a Portland cement based, free-flowing material subject to Government approval and shall be placed from the bottom of the bore hole to the bottom of the pavement. After the grout has cured somewhat, the contractor shall install concrete from the top of the grout to the top of the pavement surface. Concrete shall be consolidated and the No. 761 depression form shall be worked into the fresh concrete. After the concrete has cured, the contractor shall remove and dispose of the plastic depression form, grout any voids apparent and grind high areas smooth. Tie-downs shall be oriented as directed. Grout shall be used to displace ground water in holes where ground water is present.

#### 15. DUCTBANK INSTALLATION:

15.1 Ductbank Joints: Joints in plastic ductbank conduit shall be of the solvent cement type, using couplings for Schedule 40 PVC when necessary, fabricated in accordance with the duct manufacturer's recommendations.

#### 15.2 Excavation and Trenching for Ductbanks.

15.2.1 Chain Trenching: Chain trenching shall be accomplished when only one duct is required. Chain trenching shall be accomplished where indicated on the plans to the depth indicated on the plans. Ductbank installation will typically be 18-24" from grade to the top of the duct depending on the future application of the ductbank. Chain trenching for ductbank installation shall be of sufficient width to accommodate either 2 inch or 4 inch diameter conduit as indicated on the plans. After conduit is installed and inspected, trenches shall be backfilled in well compacted lifts to prevent settling. Density testing for backfilling of chain trenching is not required, but the contractor will be responsible for continued filling as settling occurs in unpaved areas. Only flowable fill will be permitted for backfilling of trenches under paved areas.

15.2.2 Excavation: Excavation for ductbanks with more than one duct shall be accomplished by backhoe or other similar equipment. Trenches shall be cut accurately. Excavation of trenches and appurtenances and filling and backfilling for ductbanks of two or more conduits shall be in accordance with the applicable portions of SECTION: EXCAVATION AND PREPARATION OF SUBGRADE and the following requirements. Ductbank installation will typically be 18-24" from grade to the top of the top duct depending on the future application of the ductbank piping.

15.3 Trenching: Width of trenches at any point below the top of the duct shall be not greater than the outside diameter of the duct plus six inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the duct. Sheeting bracing where required shall be placed within the trench width as directed by the Contracting Officer. Care shall be taken not to overexcavate.

**15.4 Removal of Unstable Material:** Where wet or otherwise unstable soil incapable of properly supporting the duct, as determined by the Contracting Officer, is encountered in the bottom of a trench, such material shall be excavated to the depth required and replaced to the proper grade with select fill bedding material, compacted as provided in paragraph FILLING AND BACKFILLING. When removal of unstable material is due to the fault or neglect of the contractor in his performance of shoring, sheeting, water removal, or other specified requirements, resulting material shall be excavated and replaced with select fill bedding material at no additional cost to the Government.

**15.5 Bedding:**

**15.5.1 Initial Bedding:** The initial bedding surface for the duct shall provide a firm foundation of uniform density throughout the entire length of the duct. Initial bedding, composed of select fill material, shall be installed as shown herein and shall be accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of the circular duct. When necessary, the bedding shall be tamped. Holes and depressions for joints shall be only of such length, depth, and width as required for properly making the type joint required.

**15.5.2 Final Bedding:** After the duct has been properly installed in the initial bedding material as specified below, additional select fill material, at a moisture content that will facilitate compaction, shall be placed along both sides of the pipe or duct in layers not exceeding six inches in compacted depth. The fill shall be brought up evenly on both sides of duct for the full length of duct. Care shall be taken to ensure thorough compaction of the select fill bedding material under the haunches of the duct. Each layer shall be thoroughly compacted with mechanical tampers or vibratory plates. for duct installed under grassed and paved areas, filling and compacting shall continue until the fill has reached an elevation of at least 6 inches above the top of the pipe.

**15.6 Placing Duct:** Each duct shall be carefully examined before being laid, and defective or damaged duct shall not be used. Ductbanks shall be laid to the grades and alignment indicated. However, any surveying requiring payment under SECTION: SURVEYING, shall be approved prior to accomplishment. Proper equipment shall be provided for lowering section of duct into trenches. Under no circumstances shall duct be laid in water, and no duct shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary at no additional cost to the Government. All ducts in place shall be inspected before installing the final bedding, concrete or flowable fill, and any sections damaged during placement shall be removed and replaced at no additional cost to the Government. Laying shall proceed from the location and in the direction recommended in writing by the duct manufacturer. Interlocking plastic duct spacers are not required for direct burial applications of duct bank conduit as the conduit spacing can be maintained by judicious use of bedding material. Conduit for ductbanks shall be installed as indicated on the plans shall be

installed in trenches with all fittings glued, well secured and inspected prior to backfilling.

#### 15.7 Filling and Backfilling:

15.7.1 Backfilling Duct in Trenches in Grassed Areas: After final bedding has been placed, compacted and accepted, the remainder of the trench shall be backfilled with excess excavated material and compacted to within 4 inches of final grade. Where concrete encased duct bank is required in grassed areas, initial and final bedding is not required. Topsoil fill material, in accordance with SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE shall be used to bring trench up to final grade. Turf shall then be established in accordance with SECTION: ESTABLISHMENT OF TURF. Compaction shall be accomplished by spreading, and compacting by mechanical rammer or tampers in layers not exceeding six inches in compacted thickness. Density testing shall be in accordance with SECTION: CONTRACTOR QUALITY CONTROL. The contractor will be required to correct any settlement occurring along the trench line for a period of one year. Settlement correction shall be accomplished by the contractor adding topsoil fill material as specified in SECTION: EXCAVATION, AND PREPARATION OF SUBGRADE to the area to bring it up to the surrounding grade. Settlement corrections shall be accomplished during the course of the work and for a period of one year after the job is accepted, as directed by the Contracting Officer, at no additional cost to the Government.

15.7.2 Filling Duct in Trenches Under Paved Areas: When ductbank conduit is installed under paved areas subject to vehicular or aircraft traffic, the ductbank shall be entirely encased in concrete or flowable fill and bedding will not be required. The contractor shall provide and install interlocking plastic duct spacers at the recommended spacing when installing concrete encased ductbank conduit. The contractor shall exercise care to ensure that no concrete or flowable fill enters the ductbank and the contractor shall ensure that the ductbank conduit is securely anchored so as to prohibit the ductbank from "floating" out of the concrete or flowable fill when it placed in the trench. When concrete encased ductbank is required, flowable fill shall be used to fill from the top of the concrete encased duct bank to the top of the existing base course or new graded-crushed-aggregate base course. Concrete and flowable fill shall be as specified in SECTION: CONCRETE, GENERAL REQUIREMENTS.

15.8 Installation of ductbank piping will be required in support of future electrical or communication wiring or other utility requirements not contained in the scope of this contract. Ductbank conduit may be installed in various configurations, such as 1, 2, 3, 4, 5, 6, or more separate ducts in a single ductbank at no change in the unit price per linear foot offered the Government for duct piping. Since the unit price offered is for linear feet of duct conduit not for linear feet of ductbank, the use of various configurations creates no discrepancy. Since duct conduit is required for future wiring installations, the contractor shall ensure that the exposed ends of all ducts are fitted

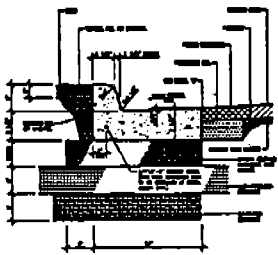
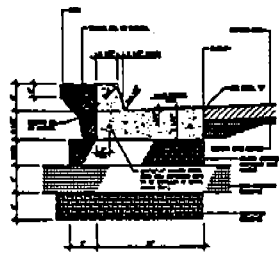
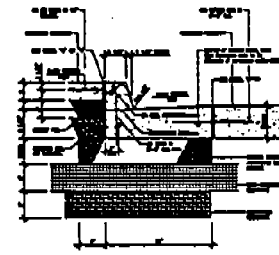
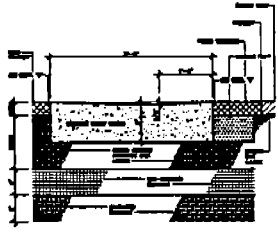
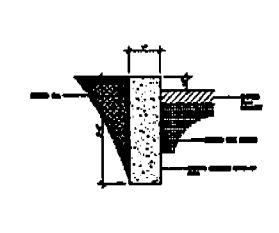
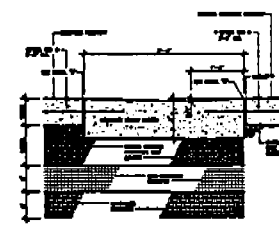
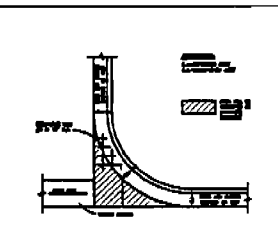
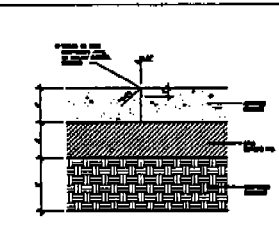
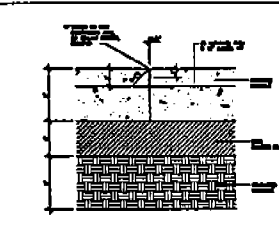
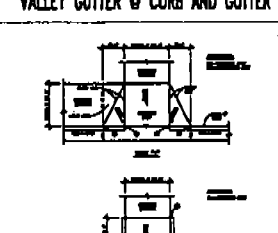
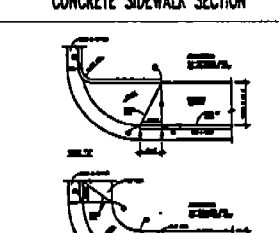
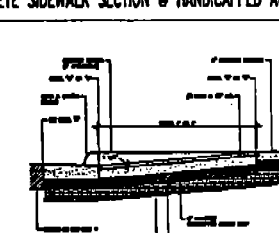
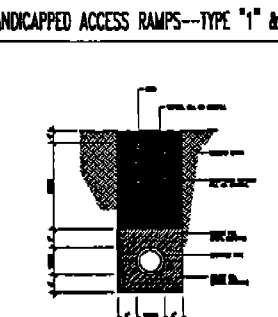
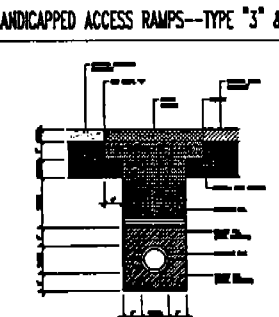
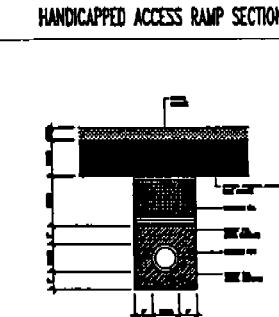
with plugs to exclude dirt and debris from the duct and each duct contains a pullrope, at no additional cost to the Government.

15.9 Pavement Boring: When it is impracticable or undesirable to cut existing pavement to install empty ductbanks in support of a future requirement, the Government may require that the pavement be bored beneath and sleeved with empty conduit. When pavement boring is desired, the contractor shall excavate pits of sufficient size on either side of the pavement into which the boring equipment may be lowered. Borings to accept single Schedule 40 PVC or DB conduits of 2 inch, 4 inch and 6 inch size are contemplated at this time. Bored holes shall be sleeved with conduits immediately after boring is complete to prevent collapse of the bore hole. Boring will most often be conducted under roadways with widths of approximately 31 feet, but boring of longer distances shall be provided at no increase in unit cost as conditions dictate.

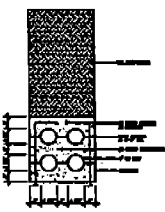
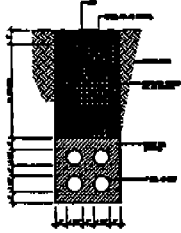
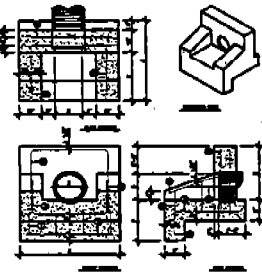
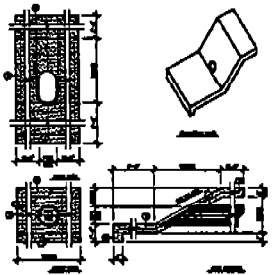
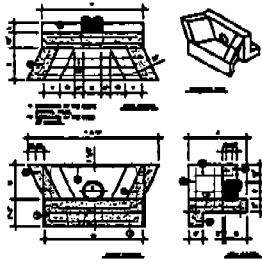
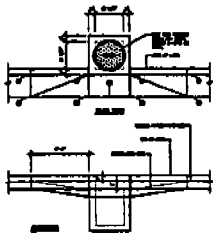
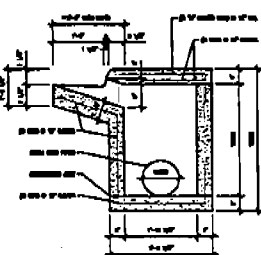
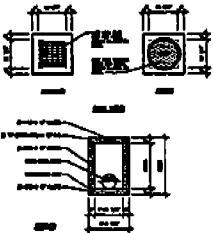
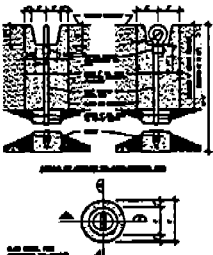



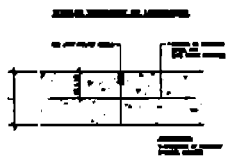

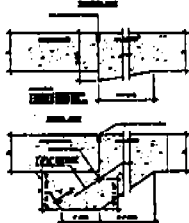
15.10 Degree of Compaction: Degree of compaction shall be in accordance with SECTION: EXCAVATION AND PREPARATION OF SUBGRADE.

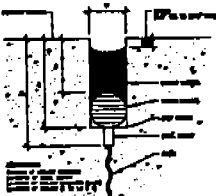
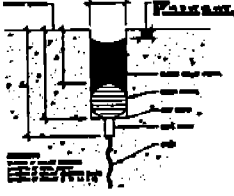
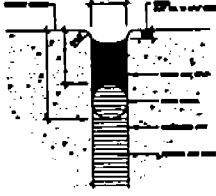
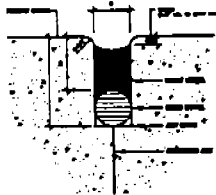
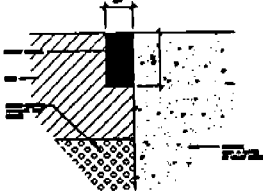
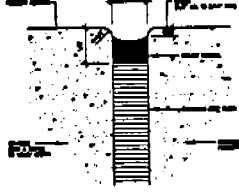
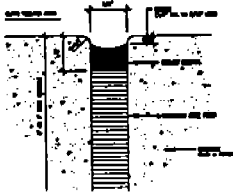
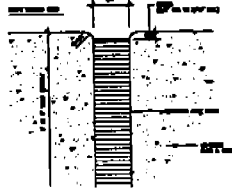
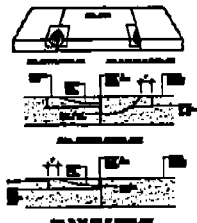
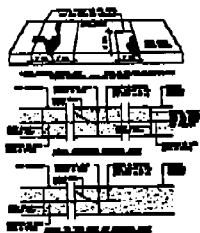
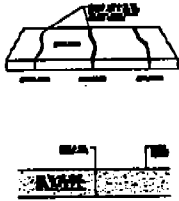
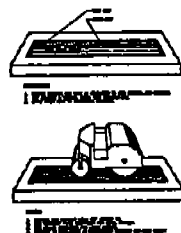

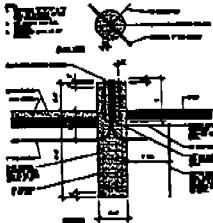
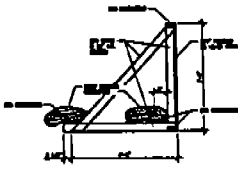
15.11 Determination of Field Density: Field density shall be determined in accordance with SECTION: EXCAVATION AND PREPARATION OF SUBGRADE and SECTION: CONTRACTOR QUALITY CONTROL.

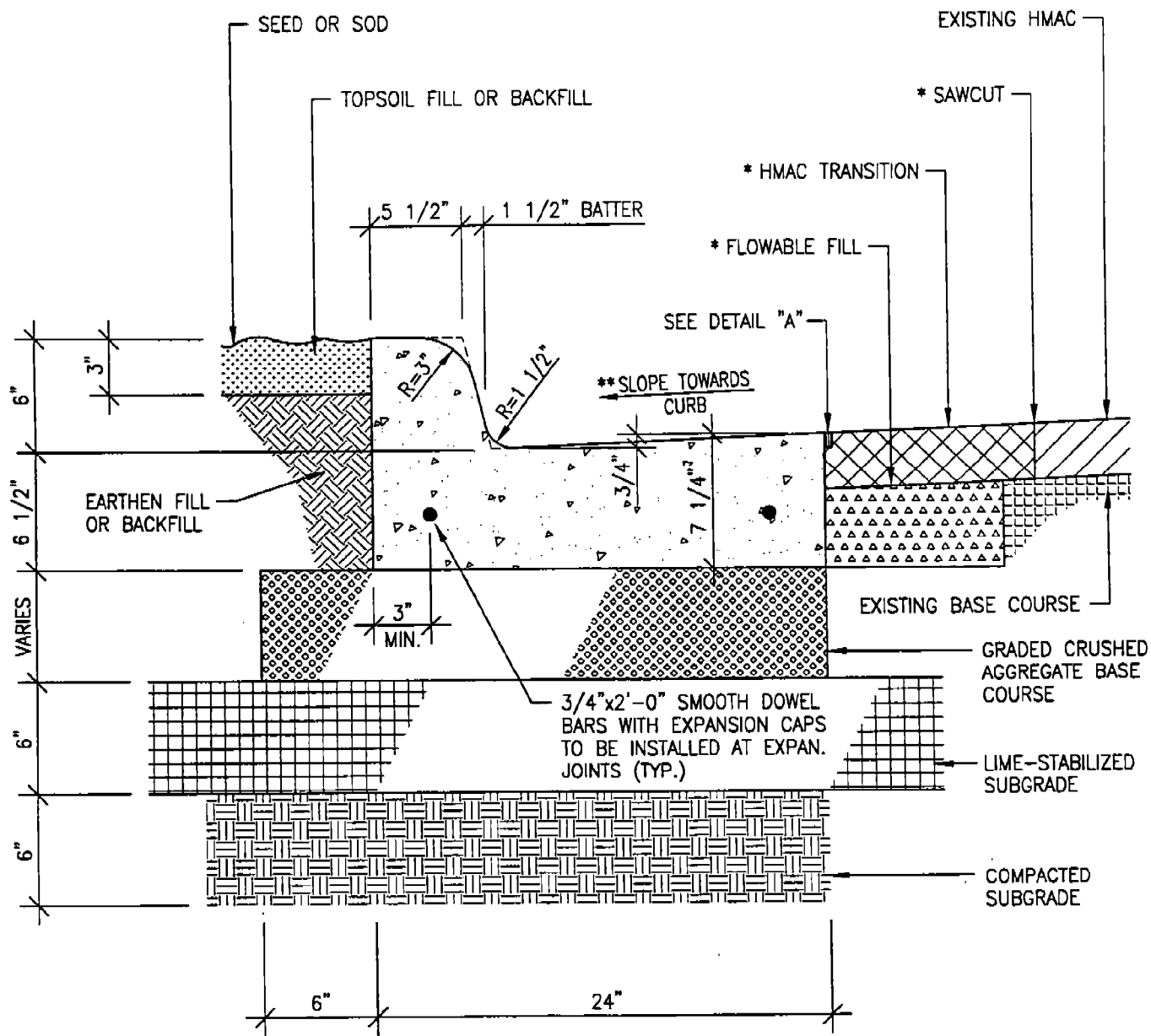
APPENDIX A

					
CONCRETE CURB AND GUTTER W/HMAC TRANSITION	1	CONCRETE CURB AND GUTTER W/O HMA TRANSITION	2	CONCRETE CURB AND GUTTER @ CONCRETE PAVEMENT	3
					
CONCRETE VALLEY GUTTER @ HMA PAVEMENT	4	EXISTING STAND-UP CURB	5	CONCRETE VALLEY GUTTER @ CONCRETE PAVEMENT	6
					
VALLEY GUTTER @ CURB AND GUTTER	7	CONCRETE SIDEWALK SECTION	8	CONCRETE SIDEWALK SECTION @ HANDICAPPED ACCESS RAMP	9
					
HANDICAPPED ACCESS RAMPS--TYPE "1" & "2"	10	HANDICAPPED ACCESS RAMPS--TYPE "3" & "4"	11	HANDICAPPED ACCESS RAMP SECTION	12
					
TRENCH SECTION @ GRASSED AREA	13	TRENCH SECTION @ EXISTING ROADWAY	14	TRENCH SECTION @ NEW ROADWAY	15
INDEX--DETAILS 1-15					SCALE: NOT TO SCALE



					
CONCRETE ENCASED DUCT BANK	16	DIRECT BURY DUCT BANK	17	HEADWALL--TYPE "A"	18
					
HEADWALL--TYPE "B"	19	HEADWALL--TYPE "C"	20	CURB INLET--PLAN & ELEVATION	21
					
CURB INLET--SECTION	22	CATCH BASIN & MANHOLE--PLAN & ELEVATION	23	PLAN AND DETAILS OF AIRCRAFT TIE-DOWN/GROUND ROD	24
					
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CONSTRUCTION JOINT FOR PLAIN CONCRETE PAVEMENTS	28	CONSTRUCTION JOINT FOR PLAIN CONCRETE PAVEMENTS BETWEEN NEW AND EXISTING PAVEMENTS	29	CONSTRUCTION JOINT FOR PLAIN CONCRETE PAVEMENTS BETWEEN NEW AND EXISTING PAVEMENTS	30
INDEX--DETAILS 16-30					SCALE: NOT TO SCALE

					
JOINT SEALANT DETAILS--CONTRACTION JOINTS	31	JOINT SEALANT DETAILS--CONTRACTION JOINTS W/SILICONE	32	JOINT SEALANT DETAILS--EXPANSION JOINTS	33
					
JOINT SEALANT DETAILS--CONSTRUCTION JOINTS	34	JOINT SEALANT DETAILS--DETAIL "A"	35	JOINT SEALANT DETAILS--DETAIL "B"	36
					
JOINT SEALANT DETAILS--DETAIL "C"	37	JOINT SEALANT DETAILS--DETAIL "D"	38	REPAIR OF CONCRETE PAVEMENTS--PARTIAL DEPTH REPAIR	39
					
REPAIR OF CONCRETE PAVEMENTS--FULL DEPTH REPAIR	40	REPAIR OF CONCRETE PAVEMENTS--CRACK REPAIR	41	REPAIR OF FLEXIBLE PAVEMENTS--DEEP PATCH REPAIR	42
					
REPAIR OF FLEXIBLE PAVEMENTS--POTHOLE REPAIR	43	MISCELLANEOUS DETAIL--LIGHT POLE FOUNDATION	44	MISCELLANEOUS DETAIL--FOD BARRIER	45
INDEX--DETAILS 31-45					SCALE: NOT TO SCALE

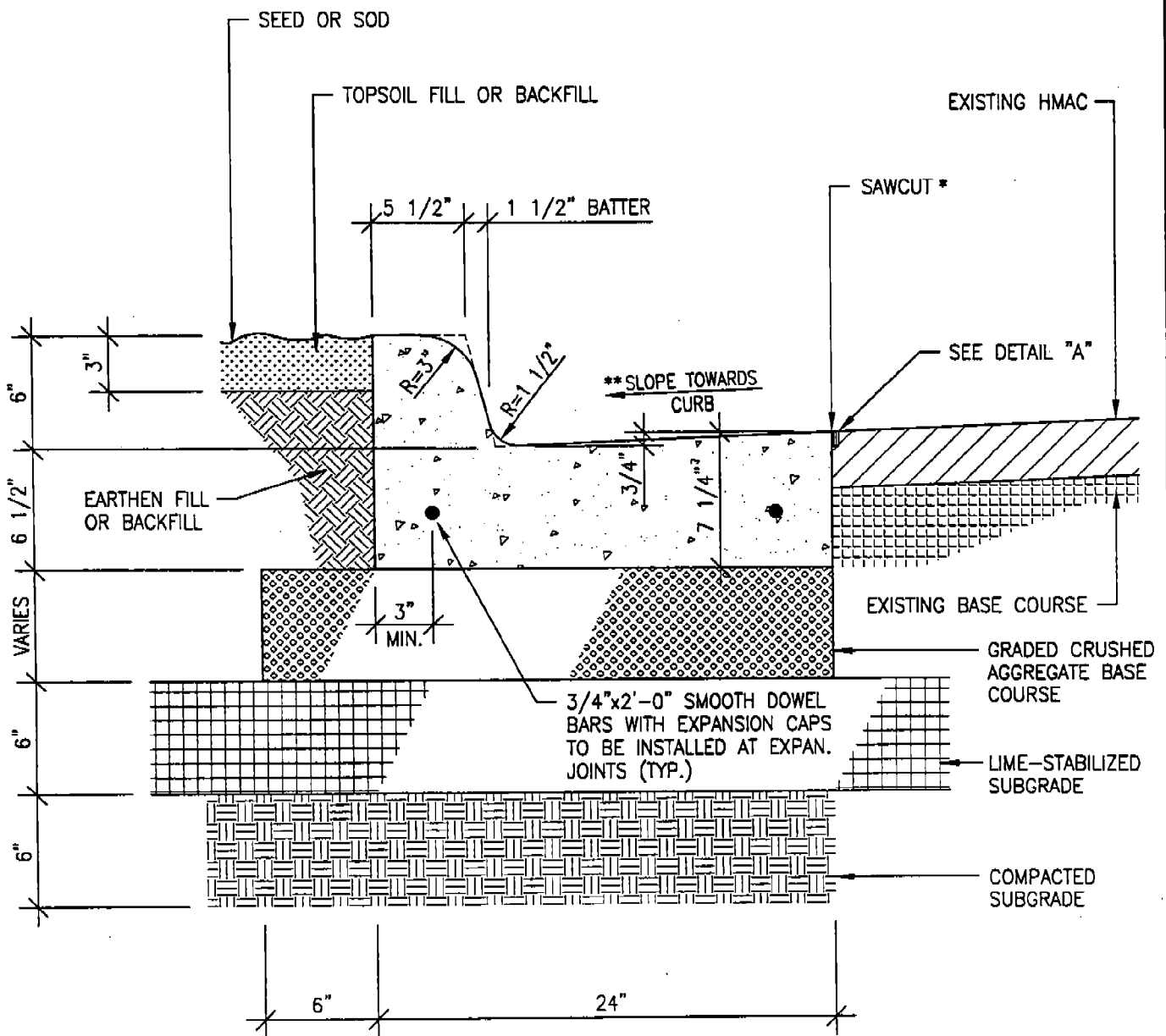


\* REQUIRED IF PLACING AGAINST EXISTING HMAC PAVEMENT IN POOR CONDITION AND AT RADII

\*\*SLOPE AWAY FROM CURB WILL BE REQUIRED IN CERTAIN SITUATIONS

# CONCRETE CURB AND GUTTER W/HMAC TRANSITION

SCALE:  
1 1/2"=1'-0"

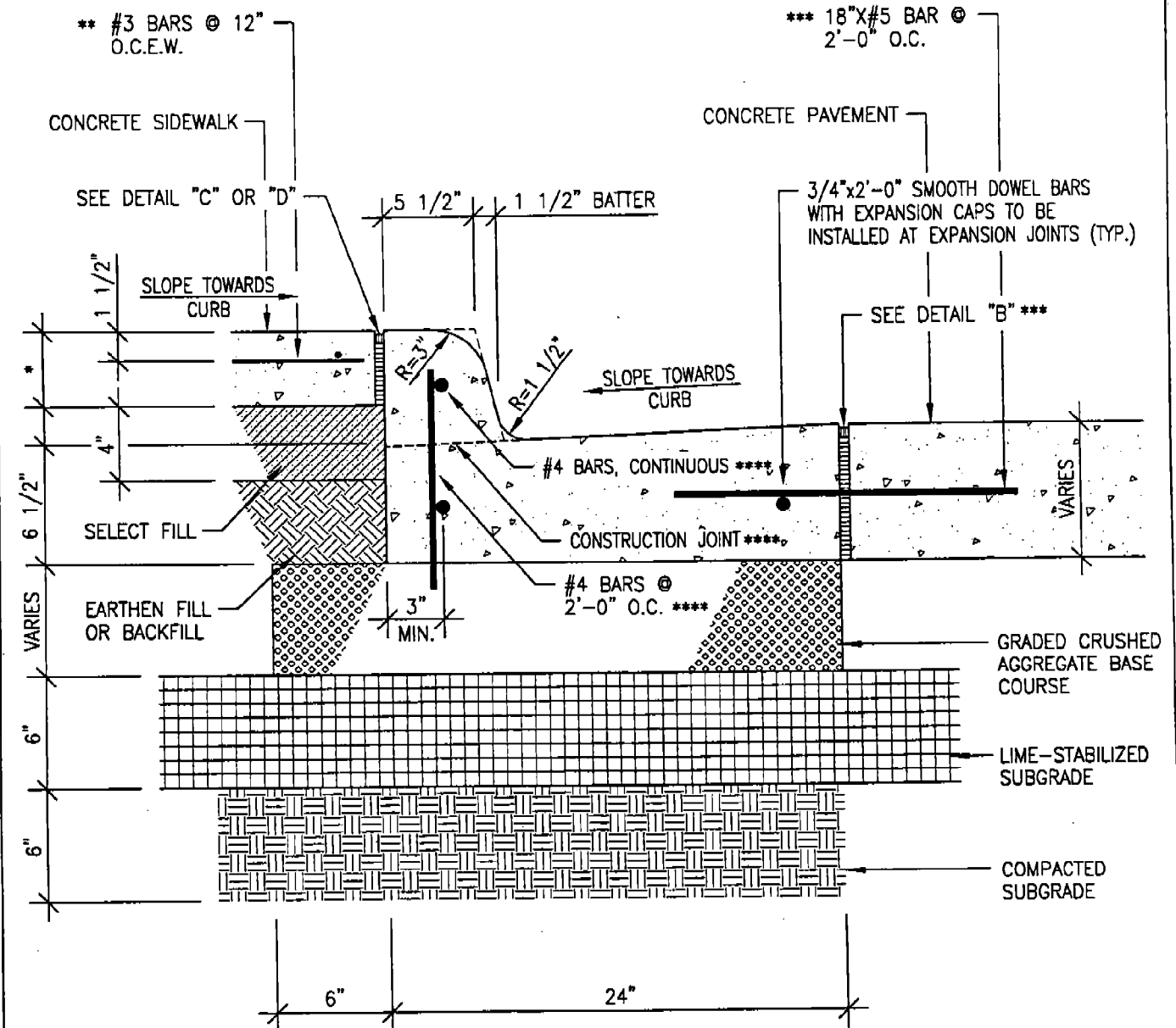


\* IF REQUIRED

\*\*SLOPE AWAY FROM CURB  
WILL BE REQUIRED IN  
CERTAIN SITUATIONS

CONCRETE CURB AND GUTTER W/O HMA TRANSITION

SCALE:  
1 1/2"=1'-0"



\* 6" AT HANDICAPPED ACCESS RAMPS, 4" AT ALL OTHER LOCATIONS

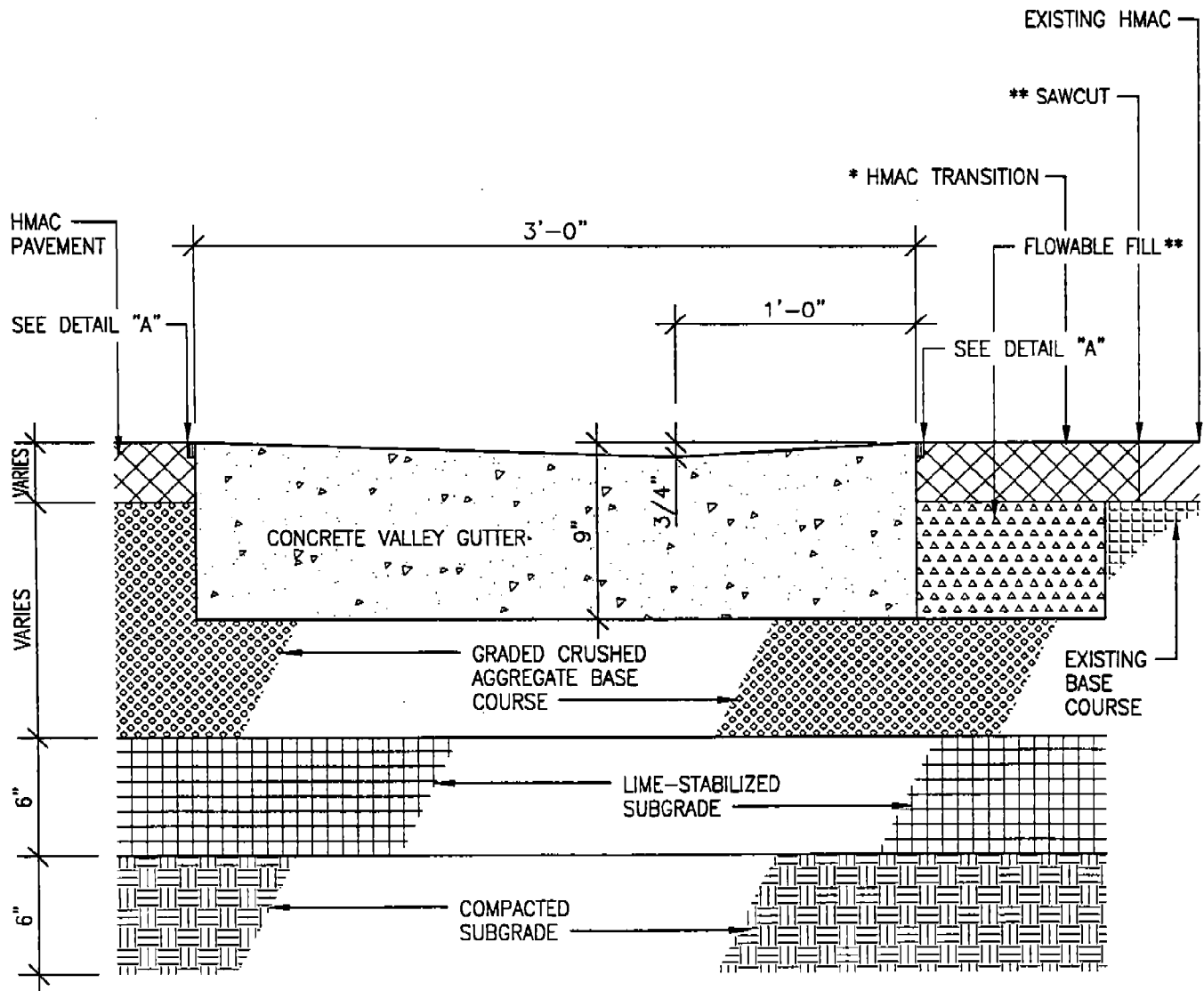
\*\* REQUIRED ONLY AT HANDICAPPED ACCESS RAMPS

\*\*\* OMIT JOINT AND BAR @ MONOLITHIC OR DOWEL-ON CURB

\*\*\*\* APPLIES ONLY WHEN DOWEL-ON CURB IS SPECIFIED

**CONCRETE CURB AND GUTTER @ CONCRETE PAVEMENT**

SCALE: 1 1/2"=1'-0"

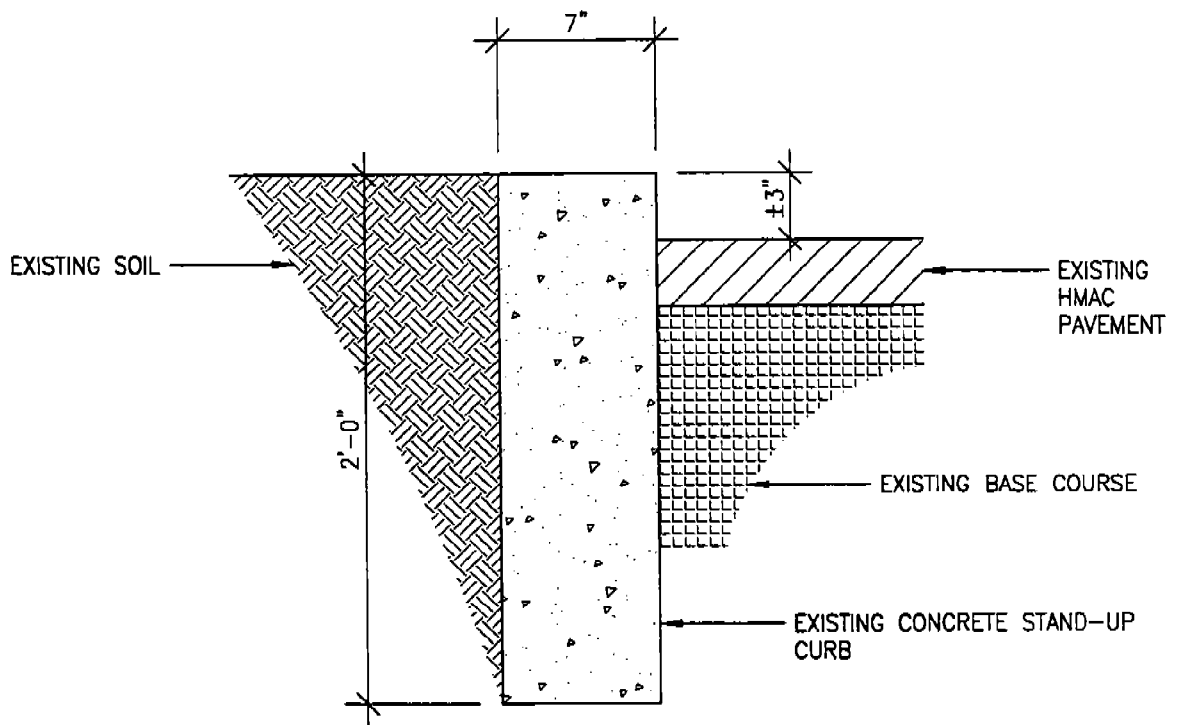


\* IF NOT REQUIRED, SEE  
DETAIL 2 OF 45 WHEN  
PLACING AGAINST EXISTING  
HMAC PAVEMENT

\*\* REQUIRED IF PLACING  
HMAC TRANSITION AGAINST  
EXISTING HMAC PAVEMENT

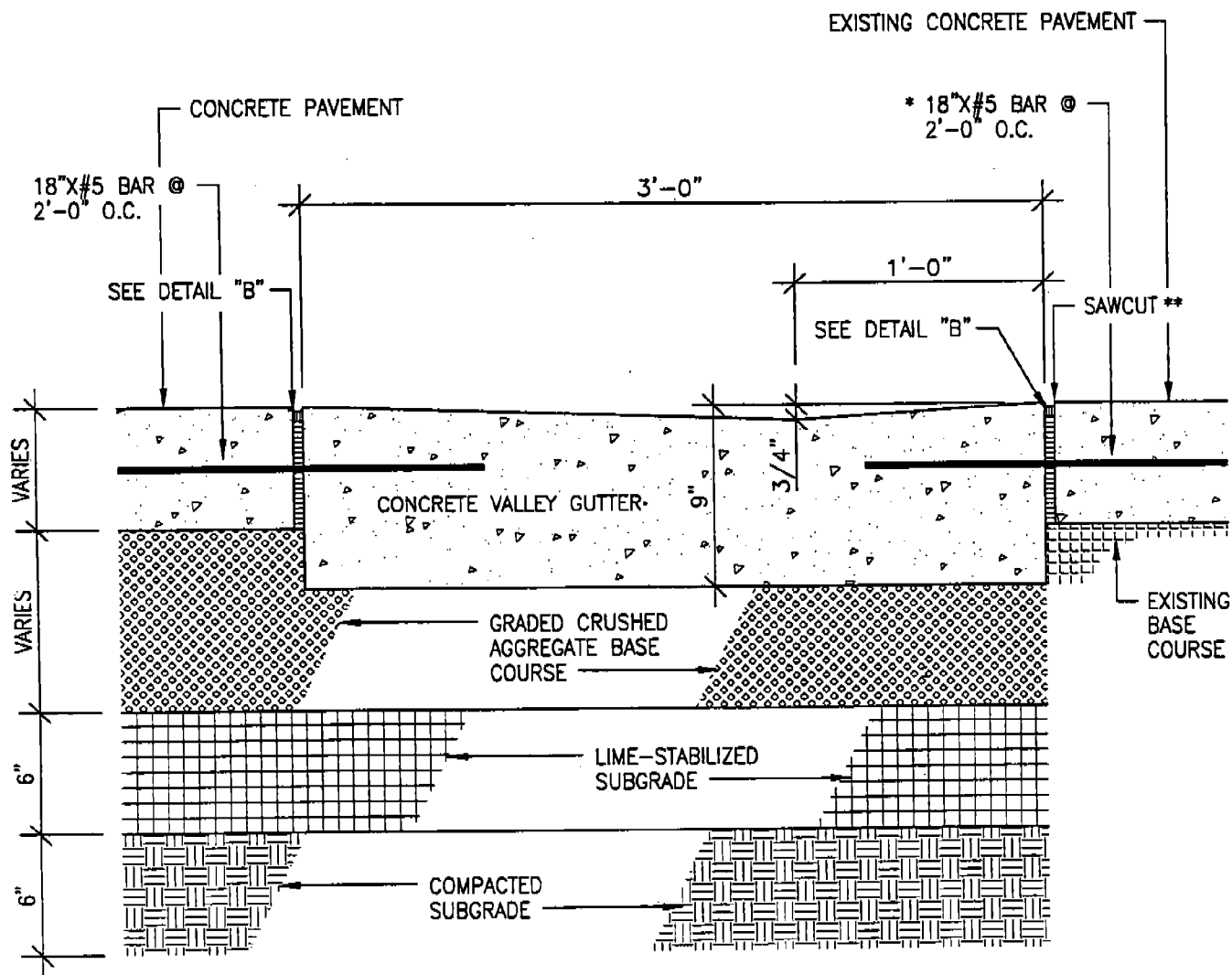
CONCRETE VALLEY GUTTER © HMAC PAVEMENT

SCALE:  
1 1/2" = 1'-0"



EXISTING STAND-UP CURB

SCALE:  
1 1/2"=1'-0"



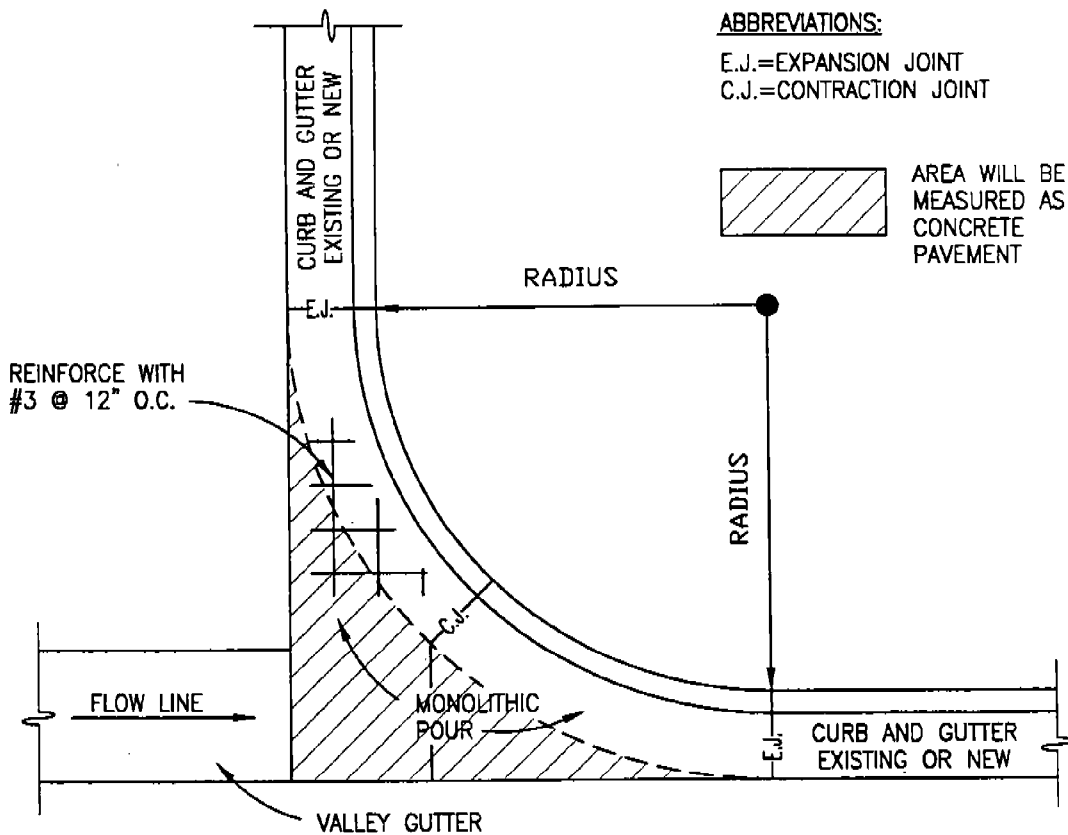
\* IF REQUIRED, SEE  
DOWELED DETAIL,  
SHEET 28 OF 45

\*\* IF REQUIRED

CONCRETE VALLEY GUTTER @ CONCRETE PAVEMENT

SCALE:  
1 1/2"=1'-0"

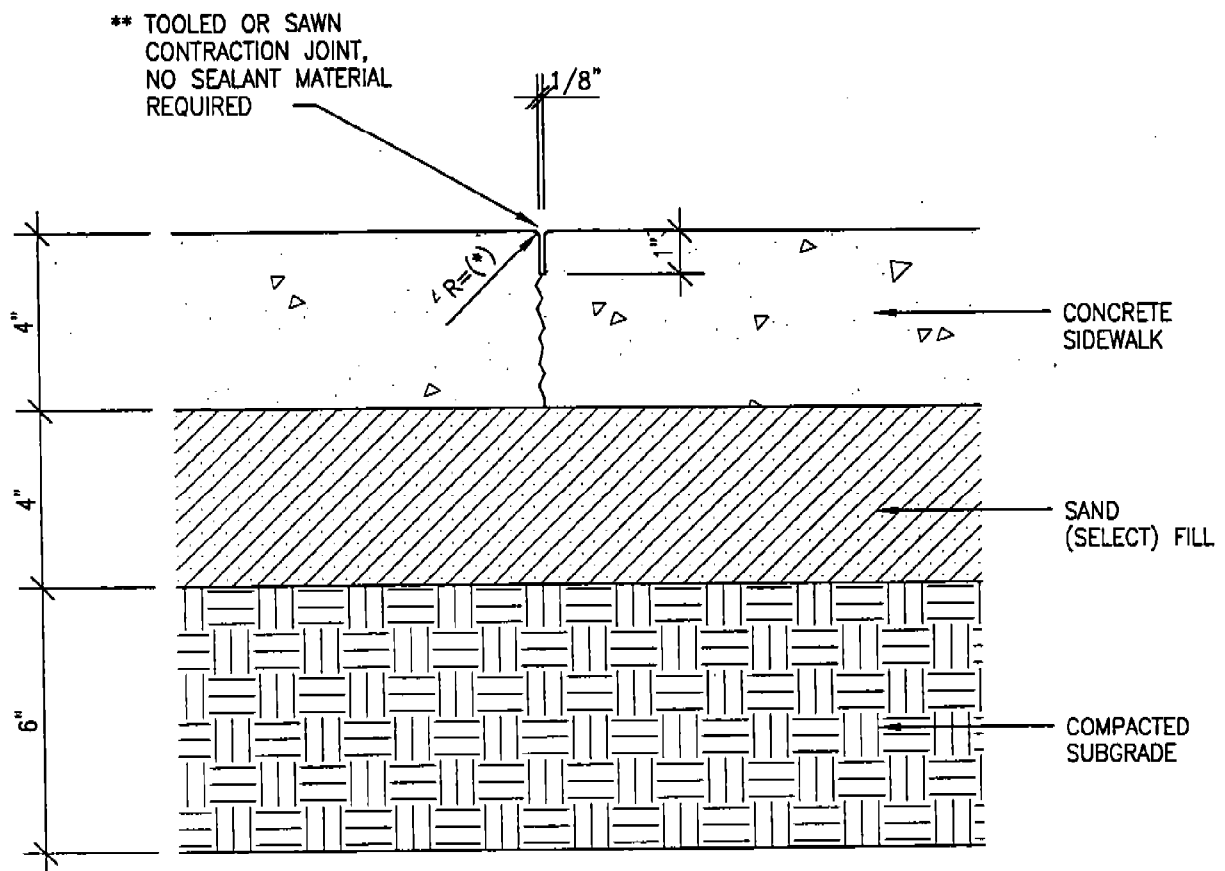




CUBIC YARD QUANTITIES FOR SHADED AREA ABOVE					
RADIUS	CUBIC YARDS	RADIUS	CUBIC YARDS	RADIUS	CUBIC YARDS
1'-6"	0.05	15'-0"	1.15	35'-0"	5.44
2'-0"	0.06	20'-0"	1.92	40'-0"	7.01
5'-0"	0.19	25'-0"	2.90	45'-0"	8.78
10'-0"	0.57	30'-0"	4.07	50'-0"	10.75

VALLEY GUTTER @ CURB AND GUTTER

SCALE:  
 1/4"=1'-0"

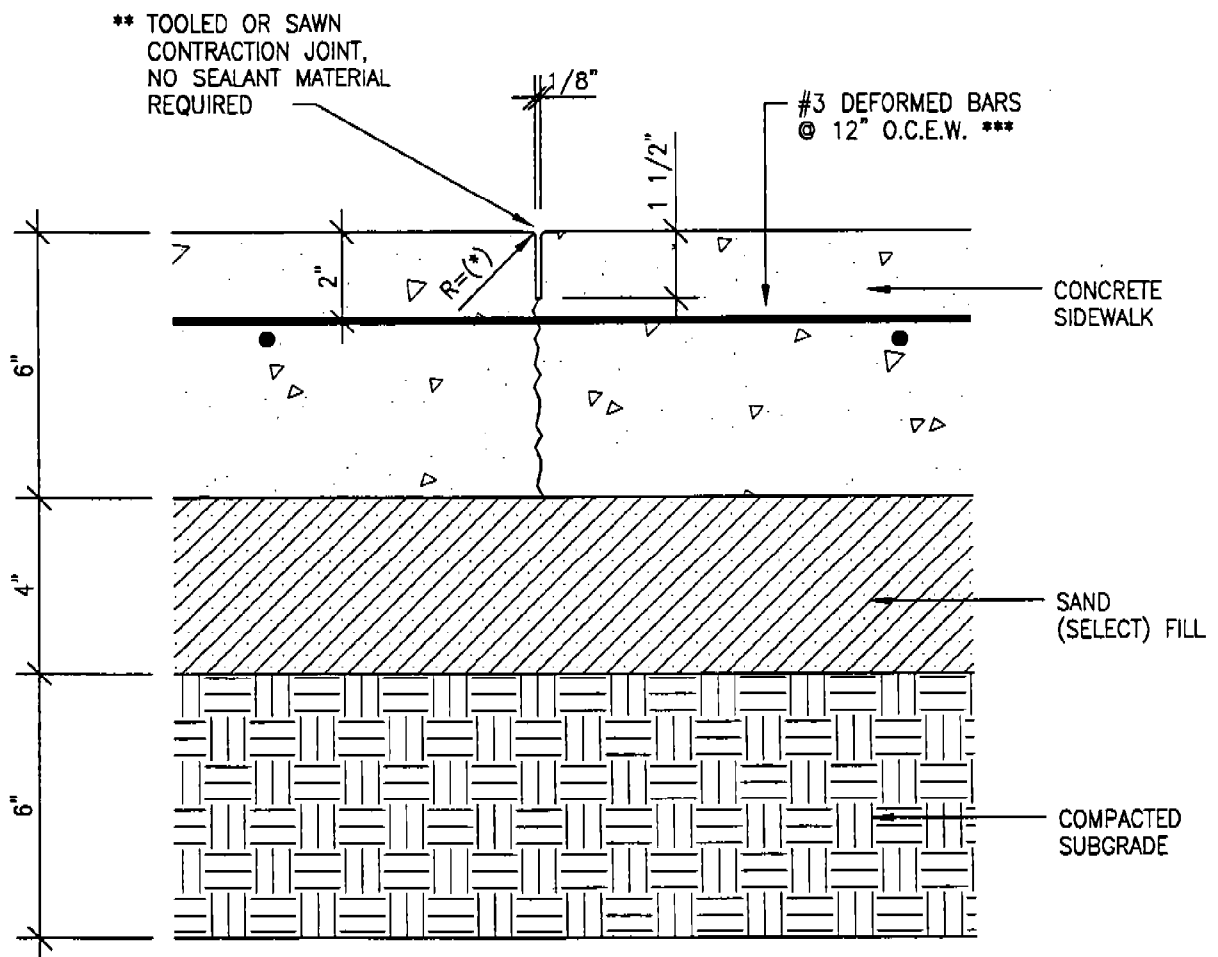


\* 1/8" RADIUS IF  
CONTRACTION JOINT  
IS TOOLED

\*\* EXPANSION JOINT  
SIMILAR TO DETAIL "C",  
SHEET 37 OF 45

# CONCRETE SIDEWALK SECTION

SCALE:  
3"=1'-0"



\* 1/8" RADIUS IF  
CONTRACTION JOINT  
IS TOOLED

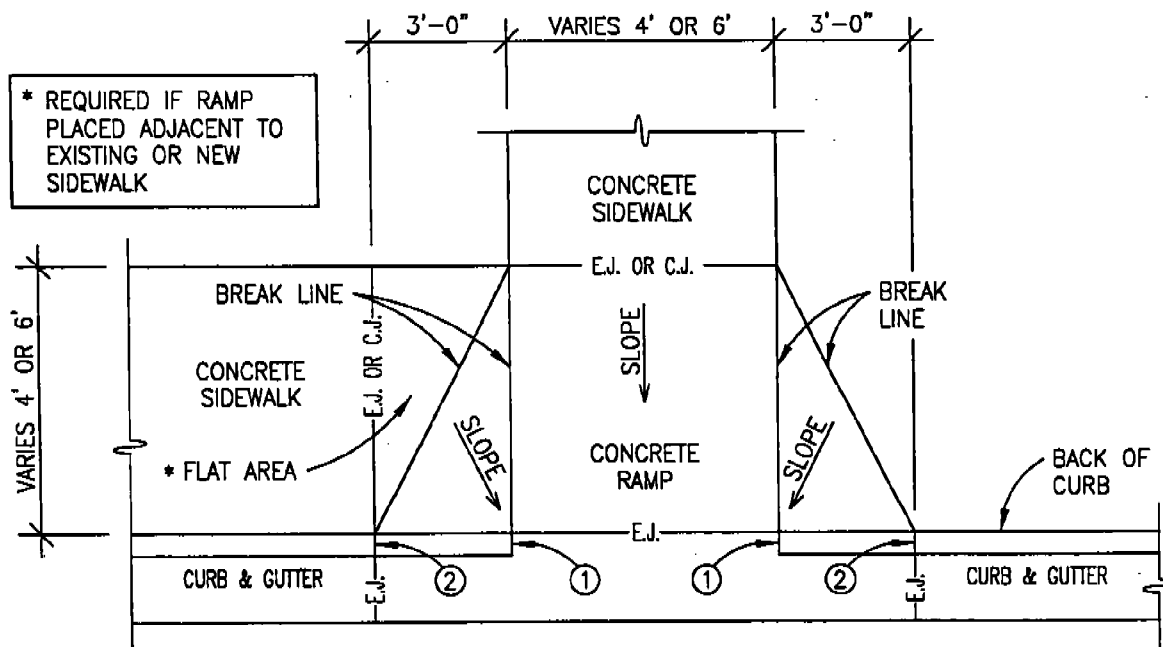
\*\* EXPANSION JOINT  
SIMILAR TO DETAIL "C",  
SHEET 37 OF 45

\*\*\* DO NOT CUT STEEL  
AT CONTRACTION  
JOINT

CONCRETE SIDEWALK SECTION @ HANDICAPPED ACCESS RAMP

SCALE:  
3"=1'-0"

\* REQUIRED IF RAMP  
PLACED ADJACENT TO  
EXISTING OR NEW  
SIDEWALK

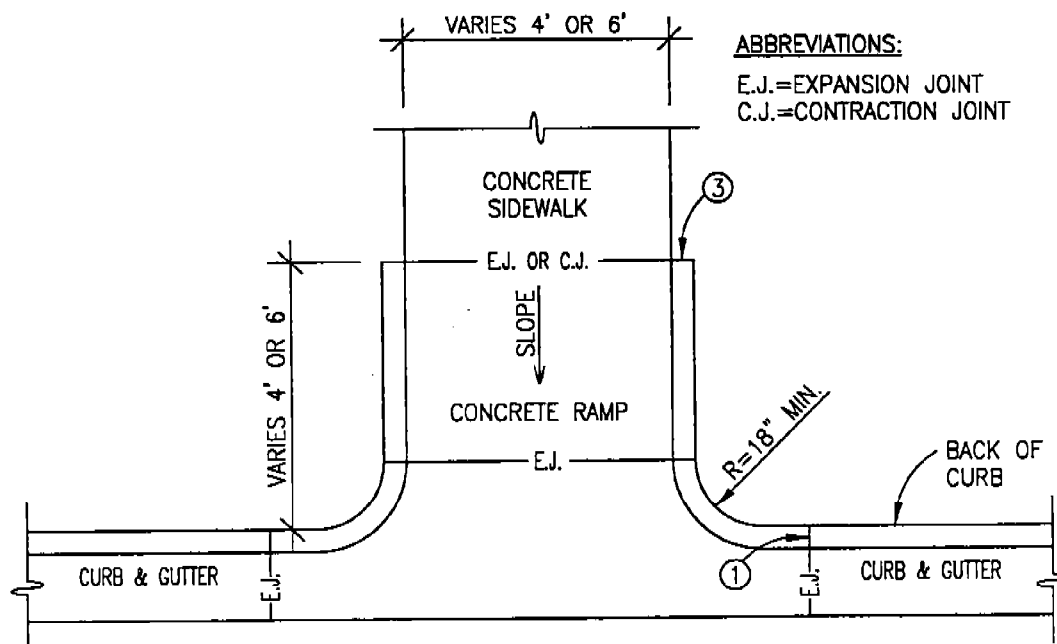


TYPE "1"

- ① 0" CURB HEIGHT
- ② 6" CURB HEIGHT
- ③ FLUSH WITH SIDEWALK

ABBREVIATIONS:

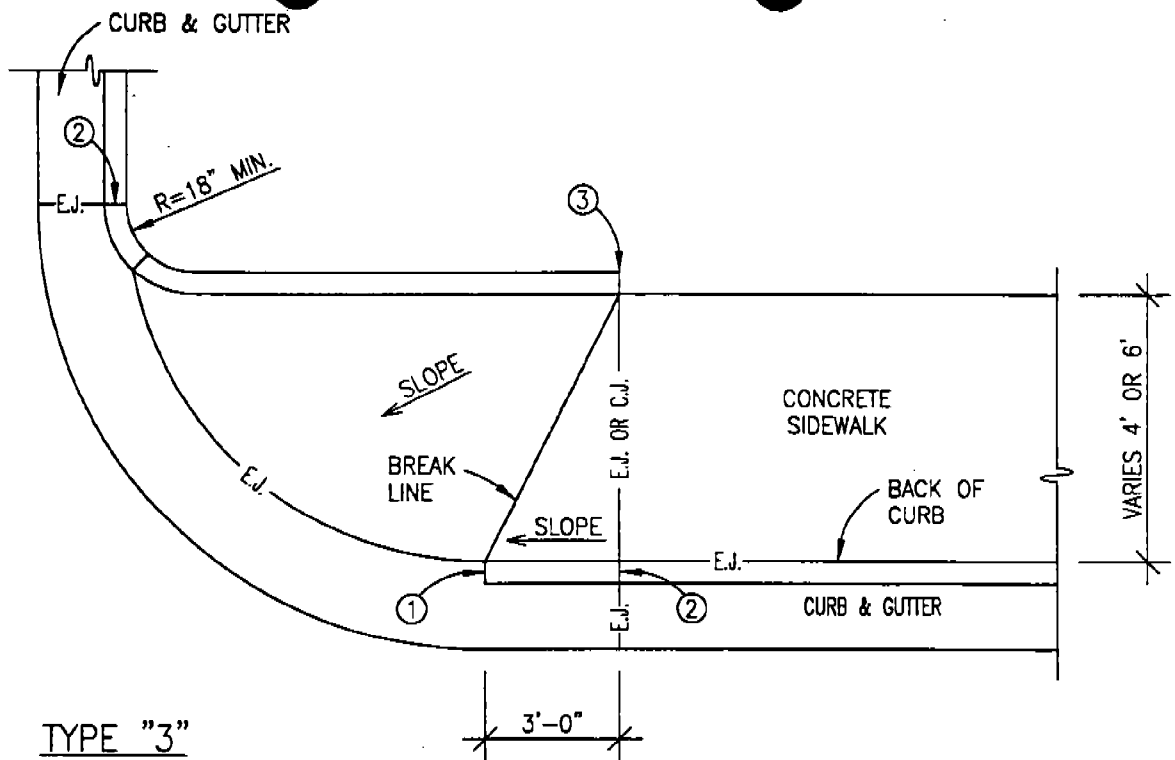
E.J.=EXPANSION JOINT  
C.J.=CONTRACTION JOINT



TYPE "2"

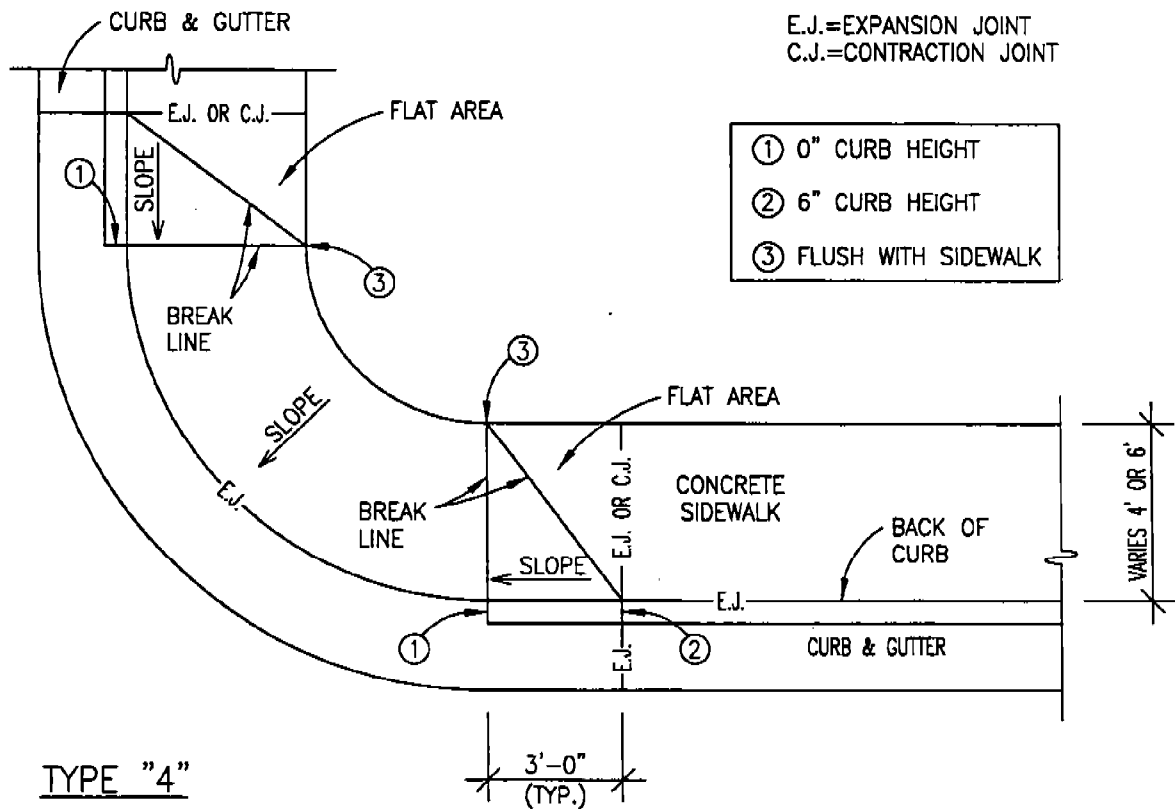
HANDICAPPED ACCESS RAMPS--TYPE "1" & "2"

SCALE:  
1/4"=1'-0"



**ABBREVIATIONS:**

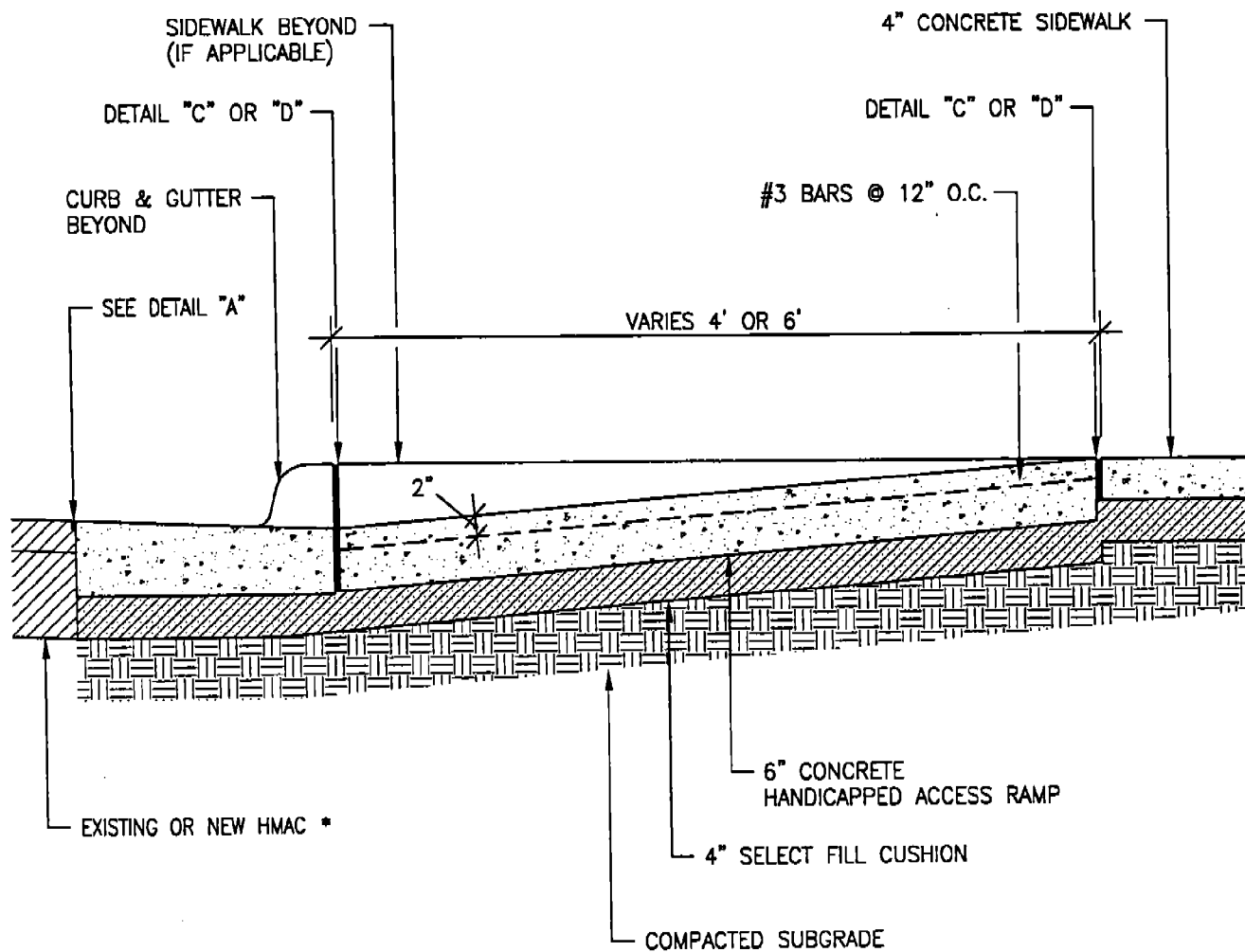
E.J.=EXPANSION JOINT  
C.J.=CONTRACTION JOINT



- ① 0" CURB HEIGHT
- ② 6" CURB HEIGHT
- ③ FLUSH WITH SIDEWALK

**HANDICAPPED ACCESS RAMPS--TYPE "3" & "4"**

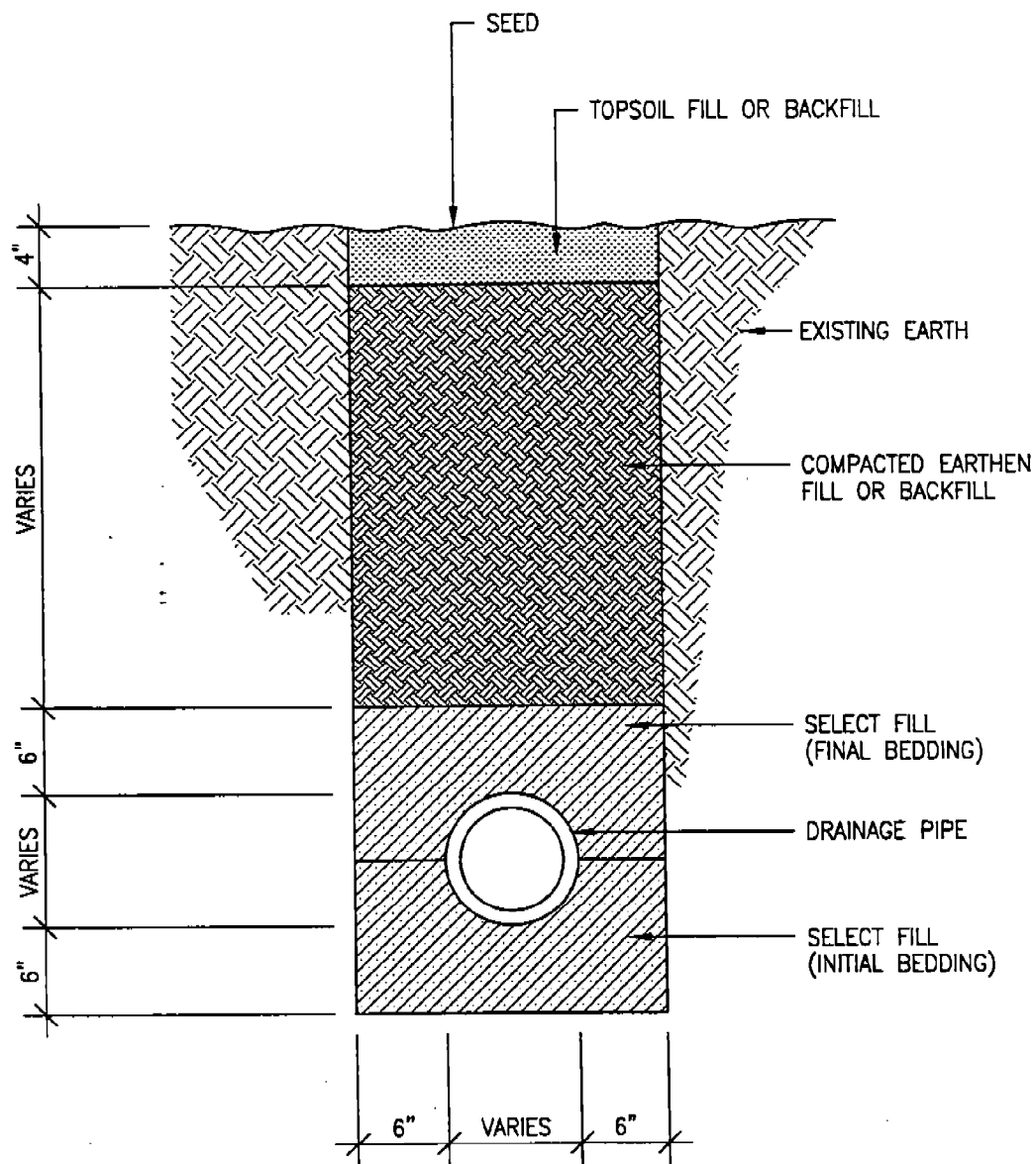
SCALE:  
1/4"=1'-0"



\* SEE SHEETS 1 THRU  
3 OF 45 FOR CURB  
& GUTTER DETAILS

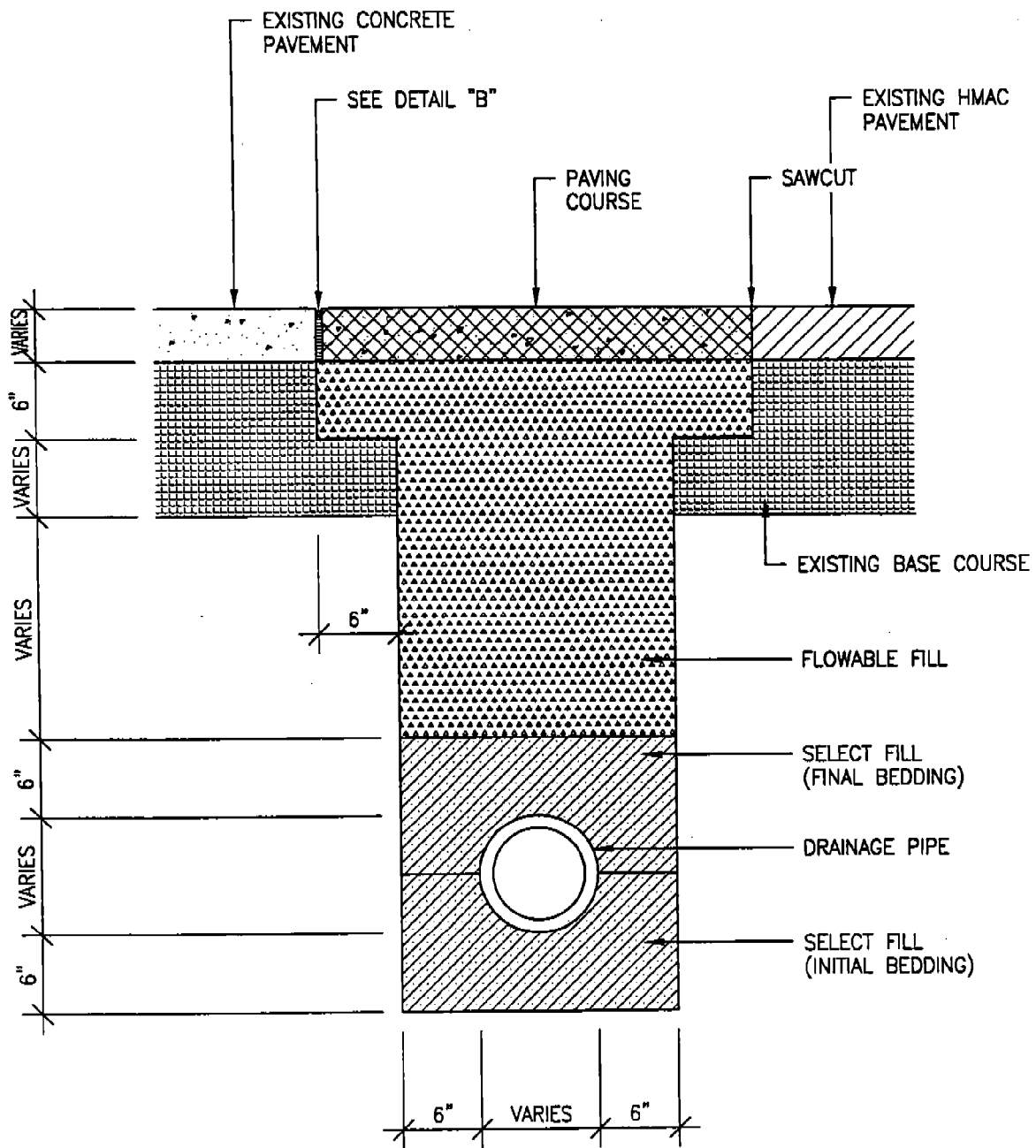
# HANDICAPPED ACCESS RAMP SECTION

SCALE:  
3/4"=1'-0"



TRENCH SECTION @ GRASSED AREA

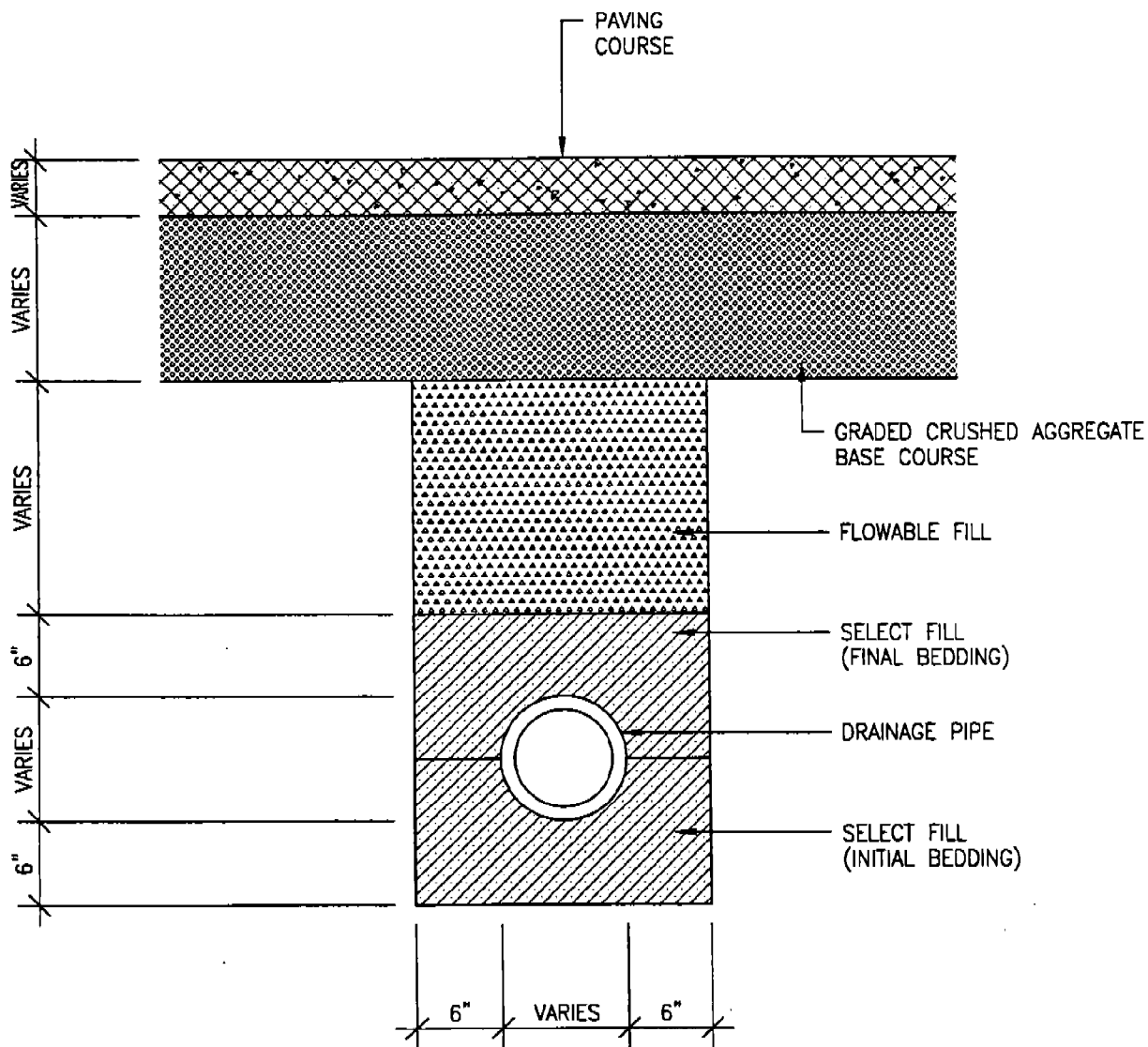
SCALE:  
1"=1'-0"



TRENCH SECTION @ EXISTING ROADWAY

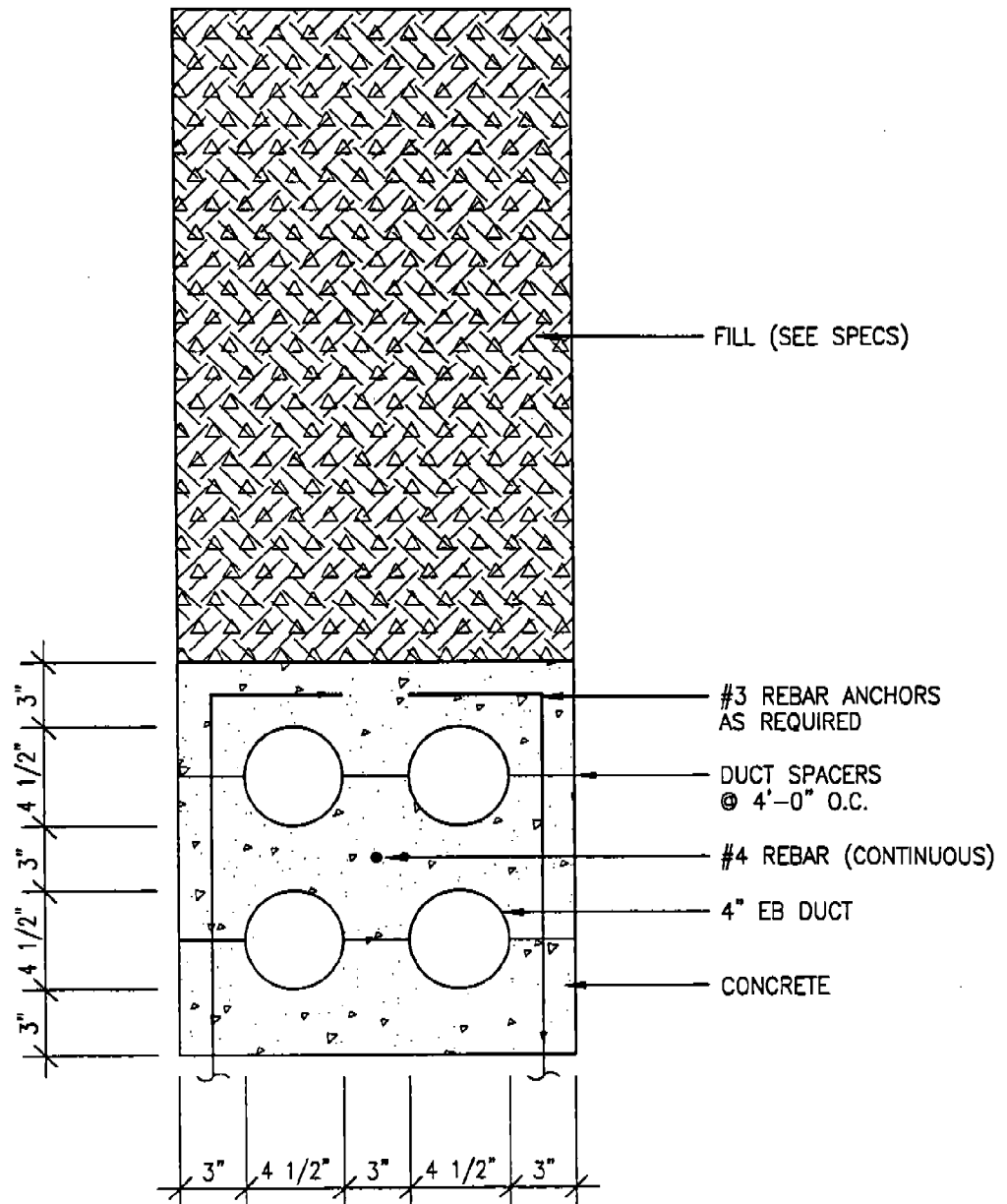
SCALE:  
1"=1'-0"





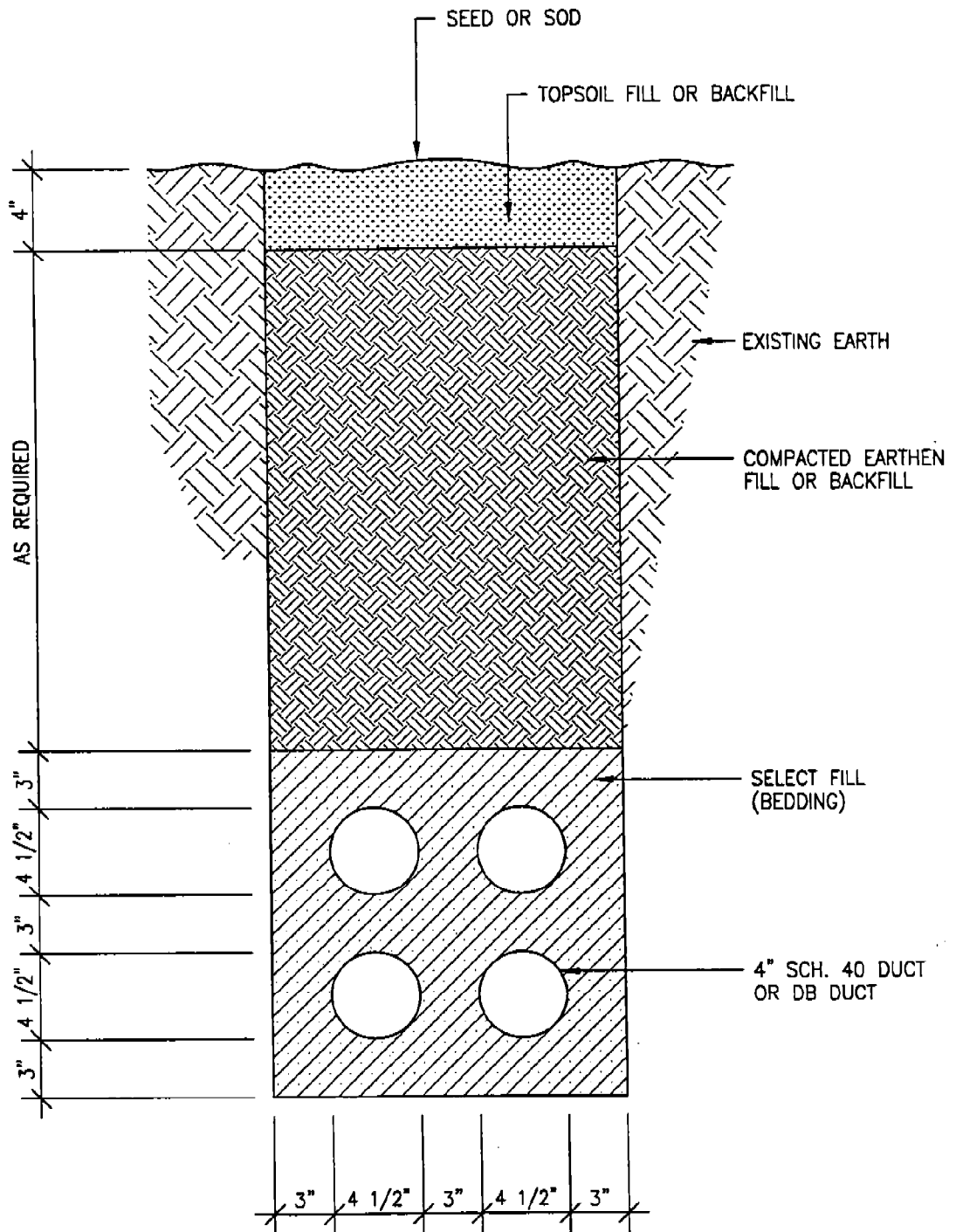
TRENCH SECTION @ NEW ROADWAY

SCALE:  
1"=1'-0"



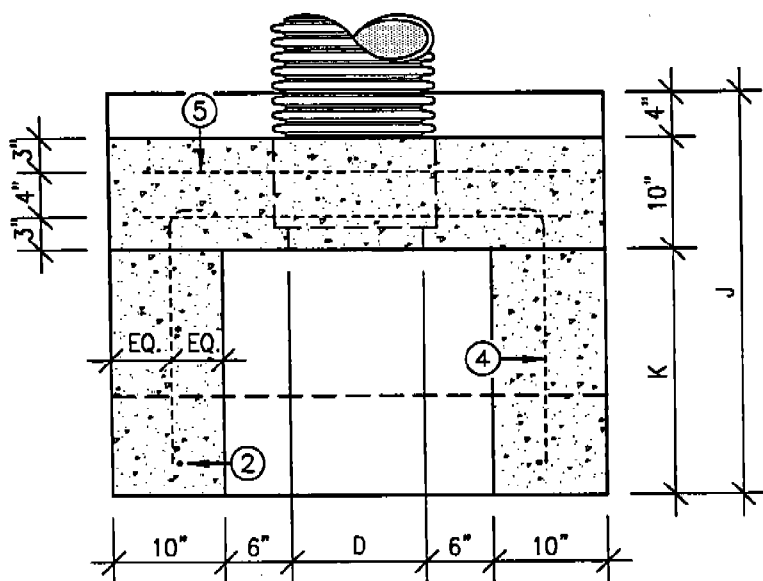
CONCRETE ENCASED DUCT BANK

SCALE:  
1 1/2"=1'-0"

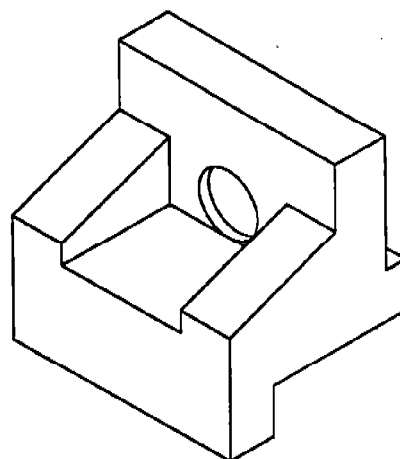


DIRECT BURY DUCT BANK

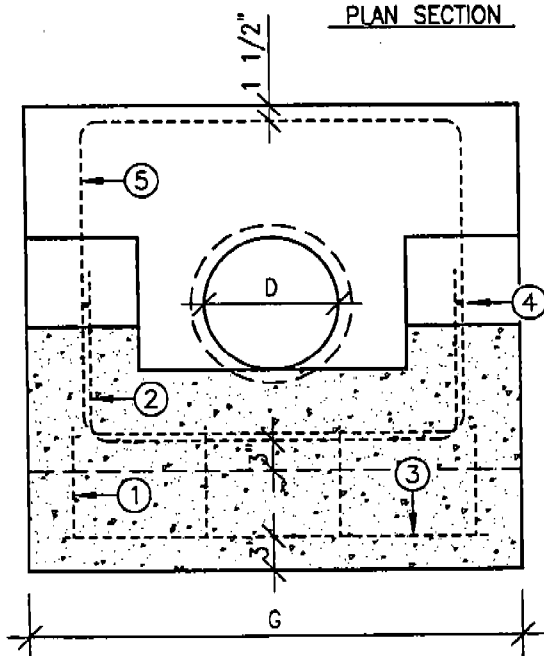
SCALE:  
1 1/2"=1'-0"



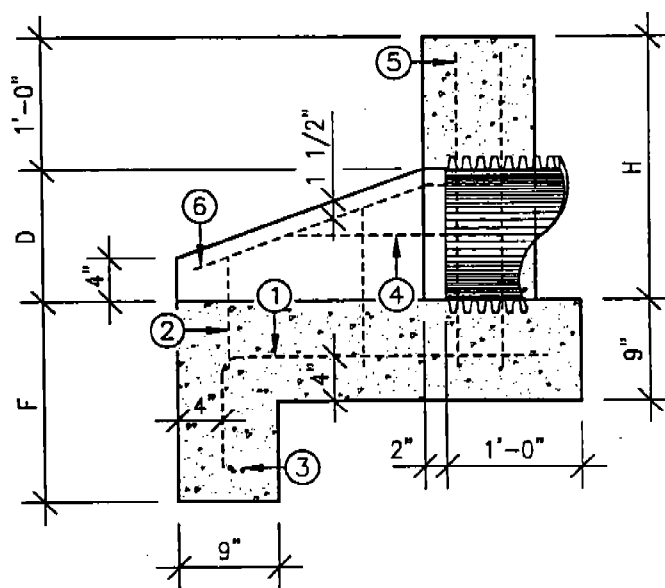
PLAN SECTION



ISOMETRIC VIEW



FRONT SECTION



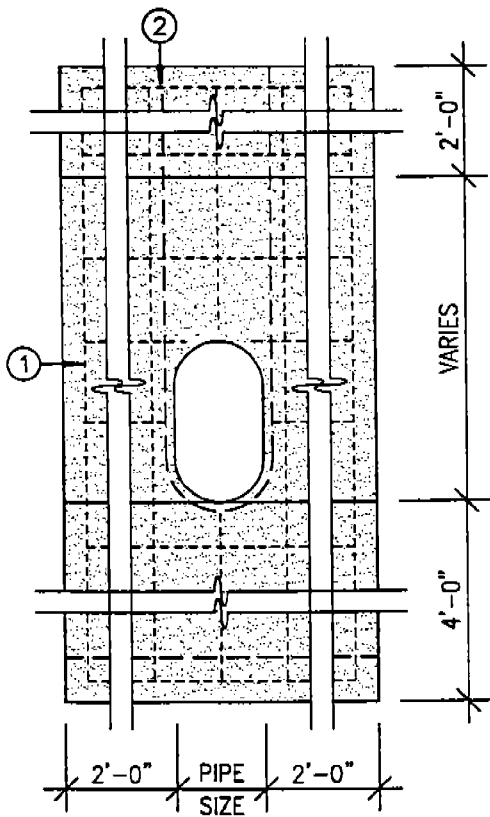
SIDE SECTION

D	F	G	H	J	K
12"	18"	44"	24"	36"	22"
15"	18"	47"	27"	42"	28"
18"	18"	50"	30"	48"	34"

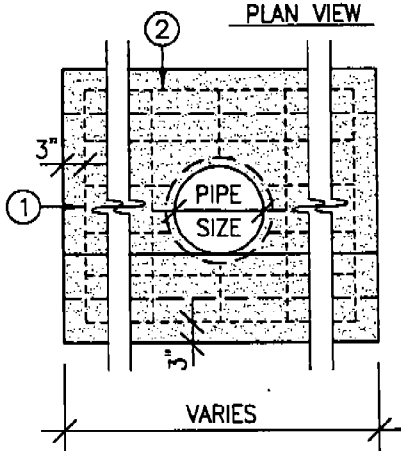
REBAR KEY NOTES			
①	1/2" L SHAPED @ 12" O.C.	④	1/2" BENT @ 12" O.C.
②	1/2" U SHAPED @ 12" O.C.	⑤	1/2" STIRRUP @ 12" O.C.
③	1/2" STRAIGHT	⑥	1/2" BENT

HEADWALL—TYPE "A"

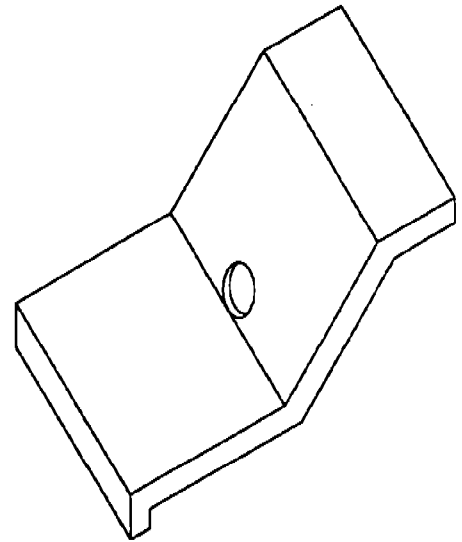
SCALE:  
3/4"=1'-0"



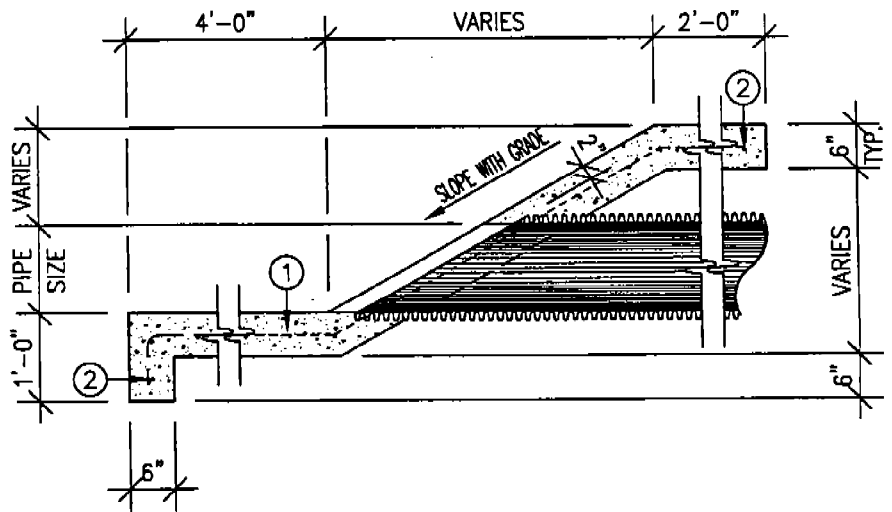
PLAN VIEW



FRONT VIEW



ISOMETRIC VIEW



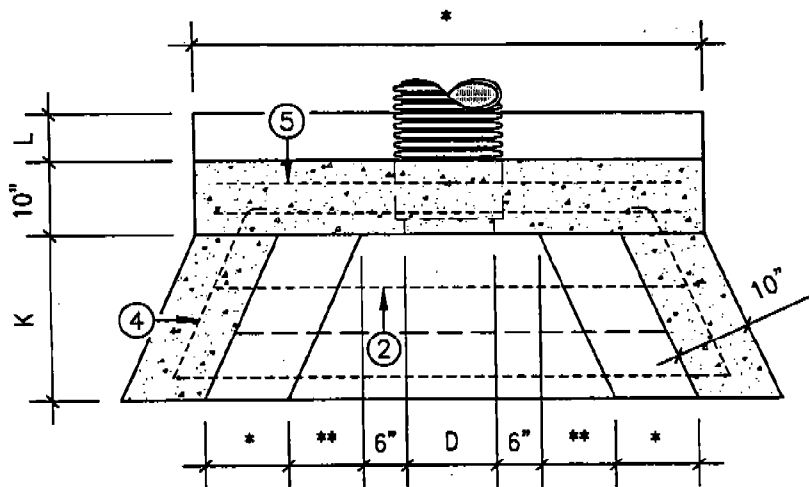
SIDE SECTION

REBAR KEY NOTES ○

- ① #3 REBAR (BENT) @ 12"O.C.
- ② #3 REBAR (STRAIGHT) @ 12"O.C.

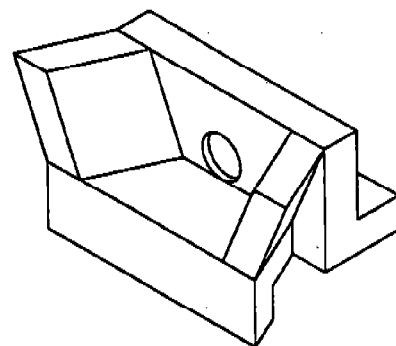
HEADWALL--TYPE "B"

SCALE:  
1/2"=1'-0"

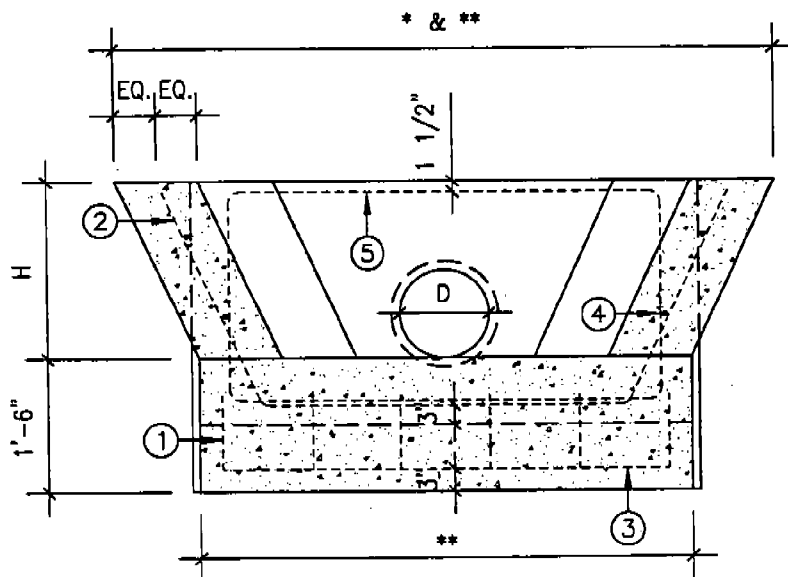


\* DETERMINED BY THE SLOPE  
CHANNEL WALLS.  
\*\* DETERMINED BY THE WIDTH  
OF CHANNEL.

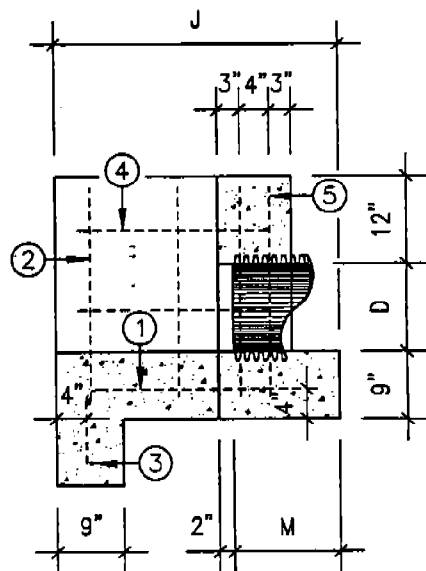
PLAN SECTION



ISOMETRIC VIEW



FRONT SECTION



SIDE SECTION

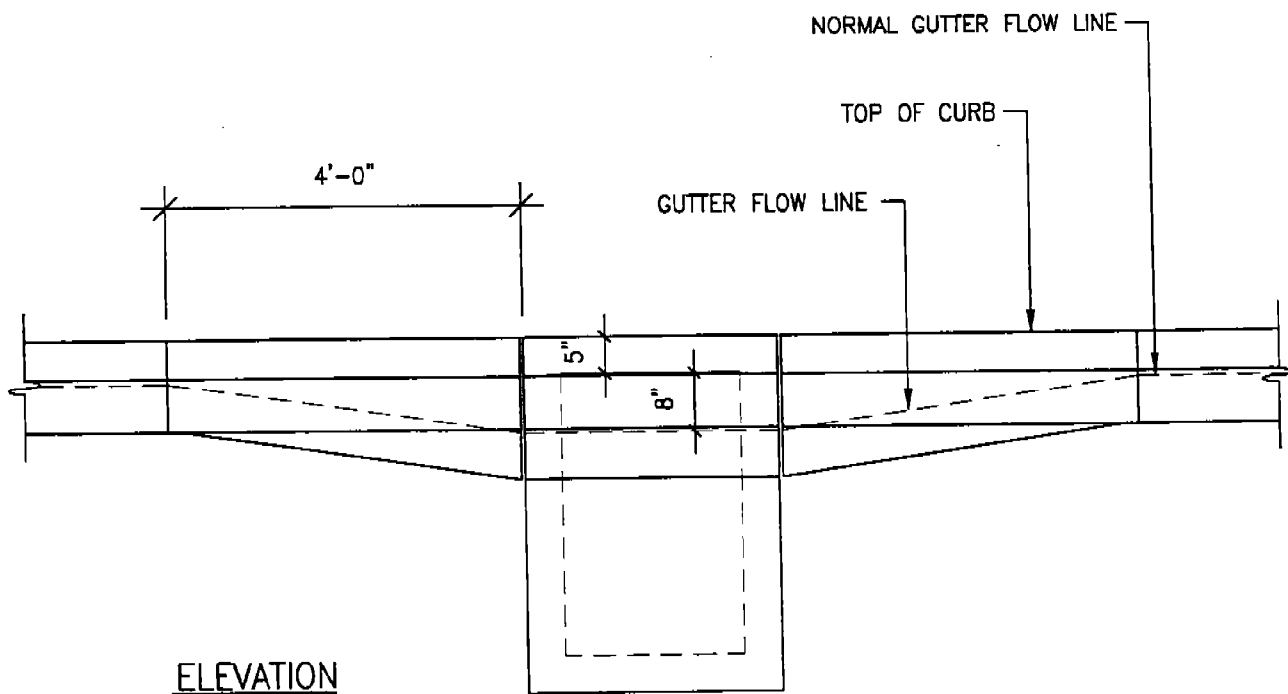
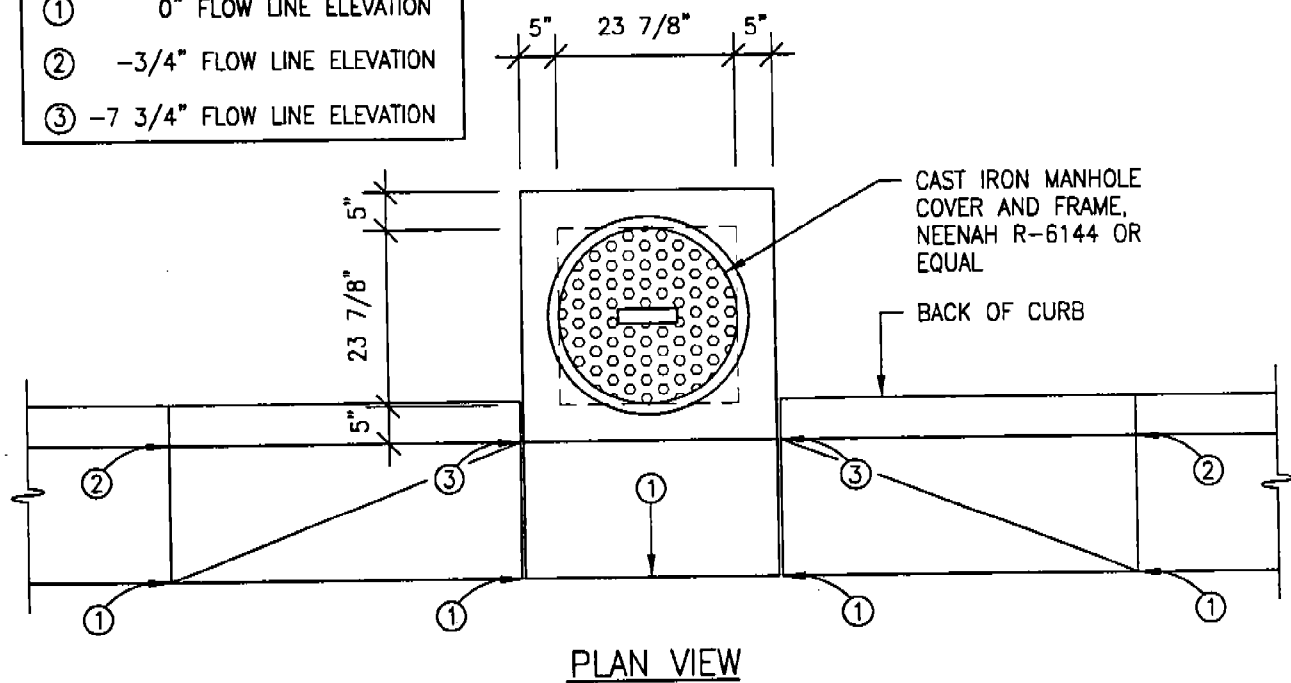
D	H	J	K	L	M
12"	24"	40"	22"	18"	26"
15"	27"	48"	28"	20"	28"
18"	30"	58"	34"	24"	32"

REBAR KEY NOTES ○			
①	1/2"Ø "L" SHAPED @ 12"O.C.	④	1/2"Ø BENT @ 12"O.C.
②	1/2"Ø "U" SHAPED @ 12"O.C.	⑤	1/2"Ø STIRRUP @ 12"O.C.
③	1/2"Ø STRAIGHT		

HEADWALL--TYPE "C"

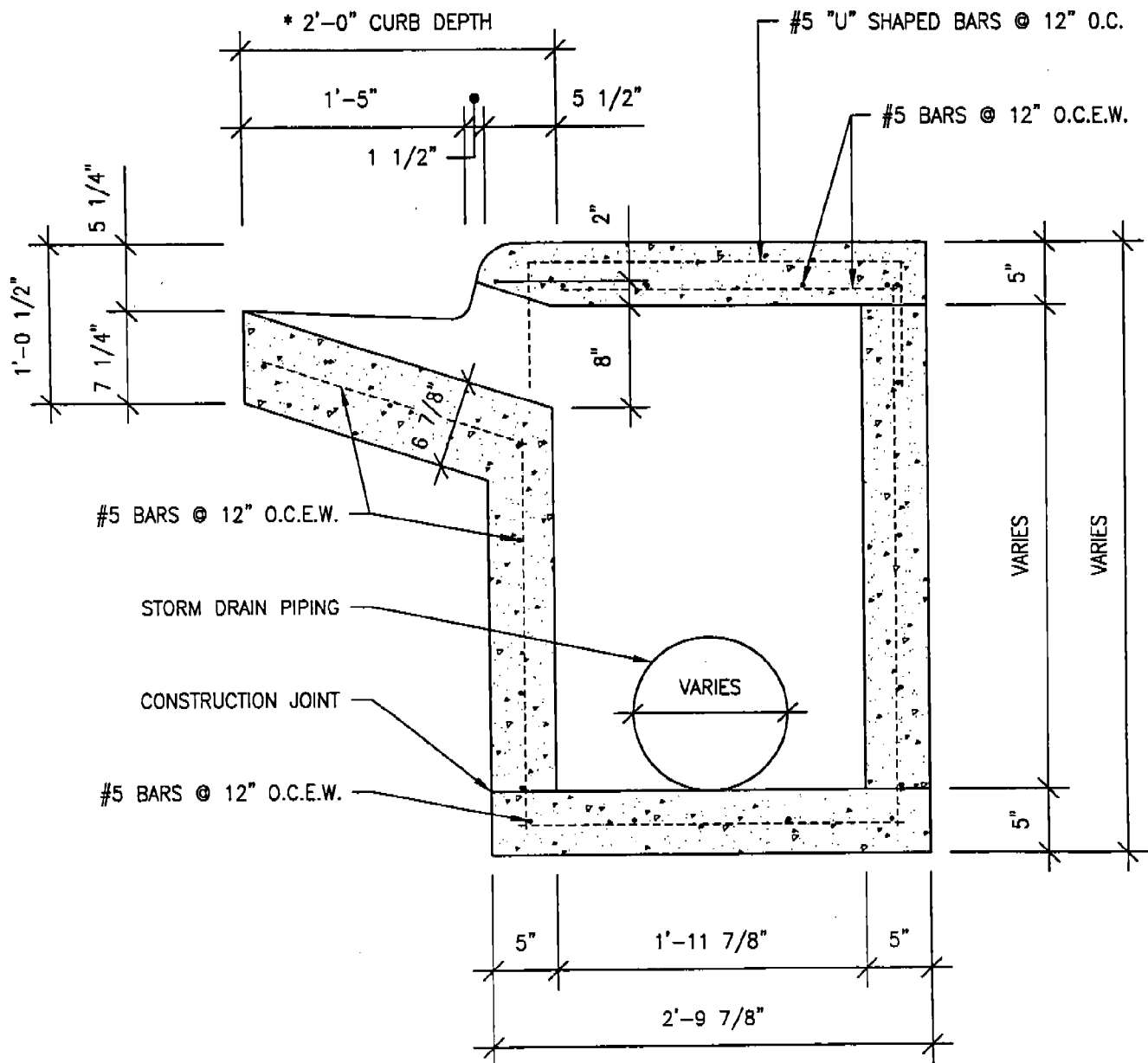
SCALE:  
1/2"=1'-0"

- ① 0" FLOW LINE ELEVATION
- ② -3/4" FLOW LINE ELEVATION
- ③ -7 3/4" FLOW LINE ELEVATION



CURB INLET--PLAN & ELEVATION

SCALE:  
1/2"=1'-0"

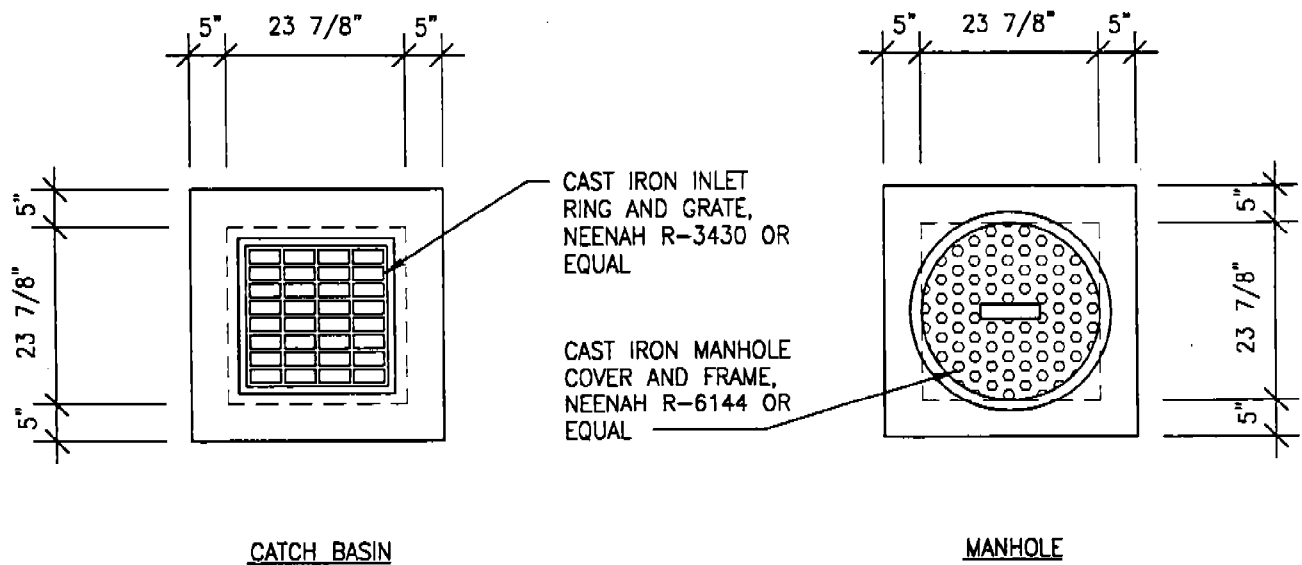


\* SEE DETAIL 1 OF 51  
FOR ADDITIONAL CURB  
INFORMATION.

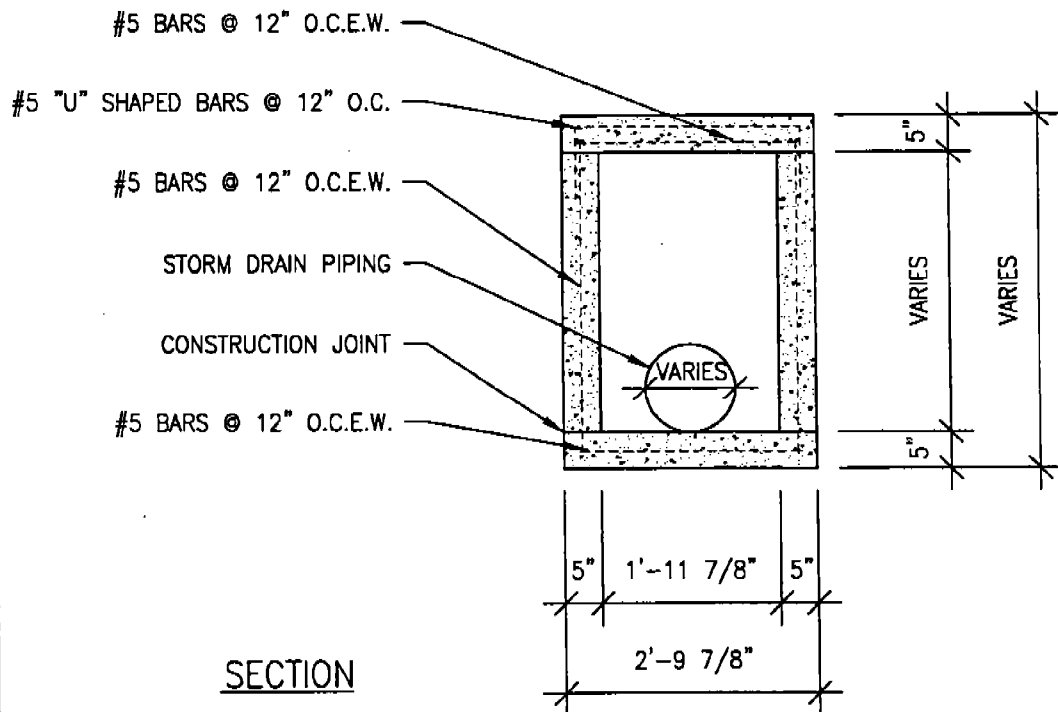
# CURB INLET--SECTION

SCALE:  
1"=1'-0"



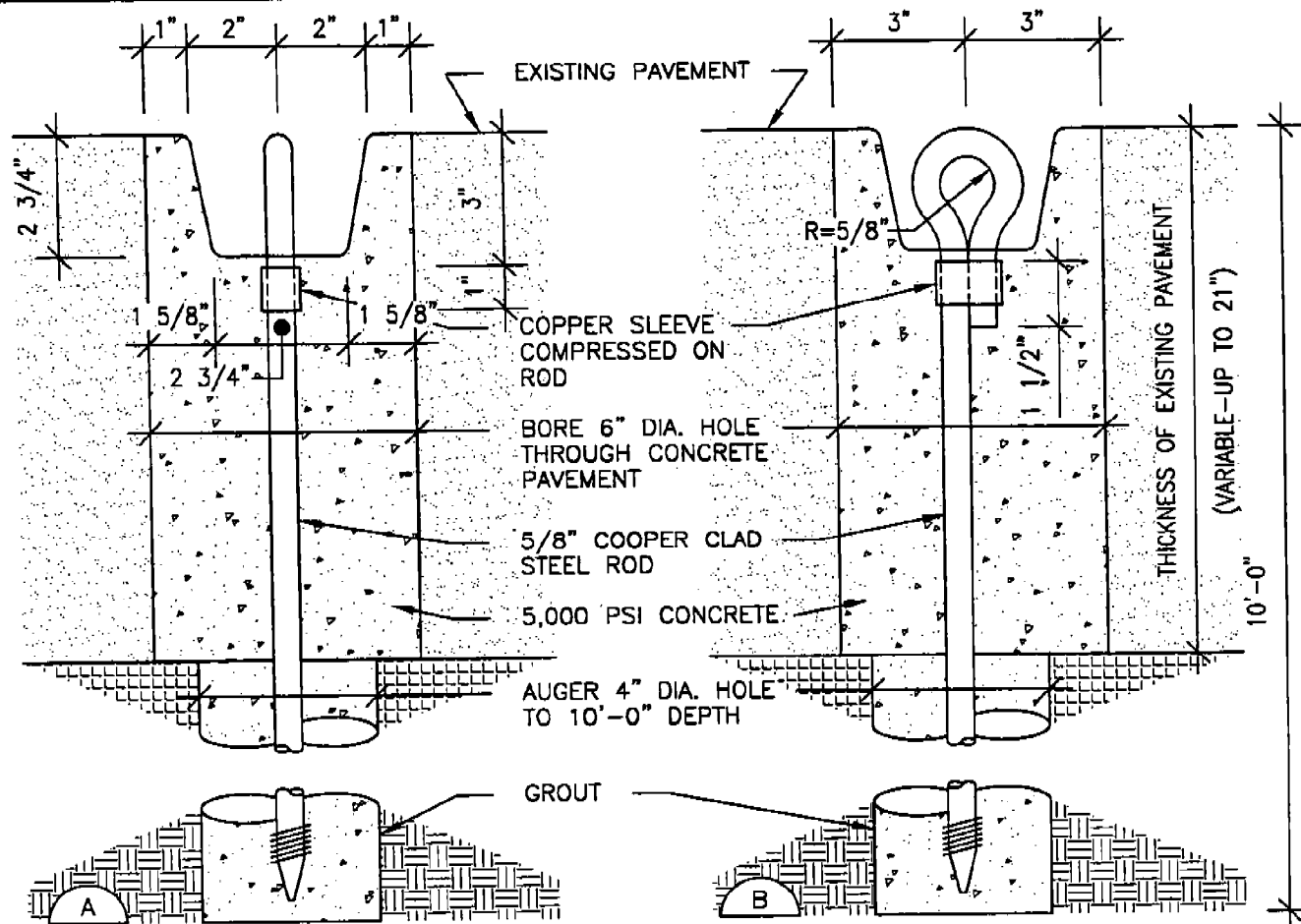


### PLAN VIEWS

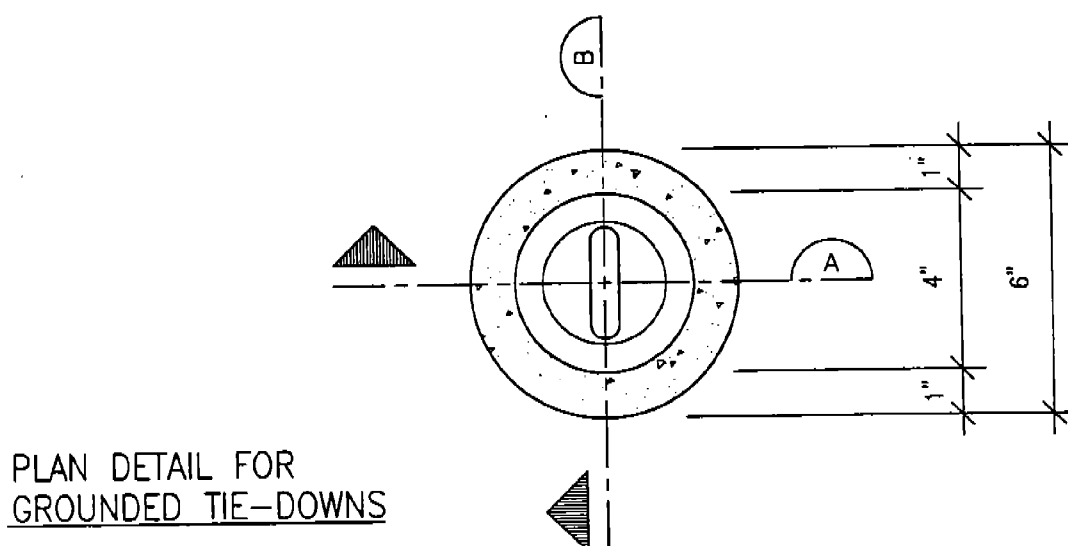


CATCH BASIN & MANHOLE—PLANS & SECTION

SCALE:  
1/2"=1'-0"



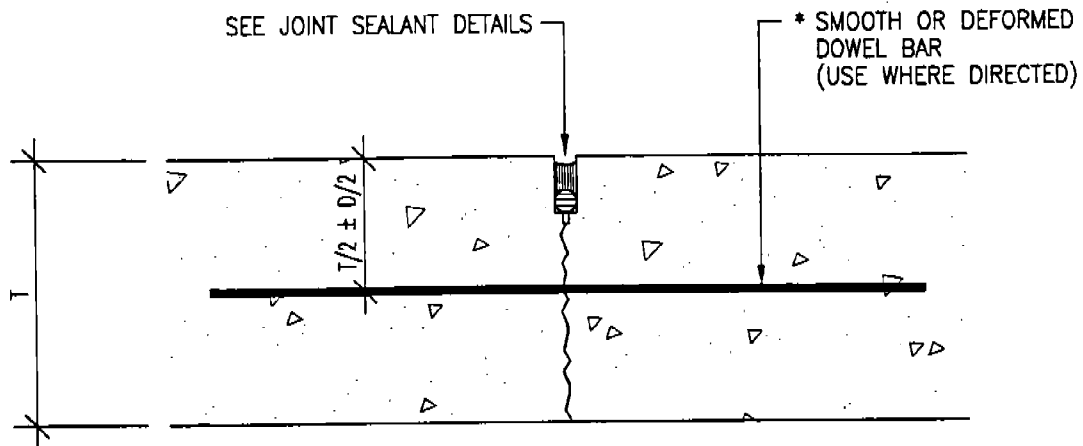
DETAILS OF AIRCRAFT TIE-DOWN/GROUND ROD



PLAN AND DETAILS OF AIRCRAFT TIE-DOWN/GROUND ROD

SCALE:  
3"=1'-0"

## TRANSVERSE OR LONGITUDINAL



### ABBREVIATIONS:

T=THICKNESS OF PAVEMENT  
D=DOWEL DIAMETER

DOWEL BAR SCHEDULE			
PAVEMENT THICKNESS (INCHES)	MINIMUM DOWEL LENGTH (INCHES)	MAXIMUM DOWEL SPACING (INCHES)	DOWEL DIAMETER AND TYPE
< 8	16	12	3/4" BAR
8.5 TO 11.5	16	12	1" BAR
12 TO 15.5	20	15	1" TO 1 1/4" BAR, OR 1" EXTRA STRENGTH PIPE
16 TO 20.5	20	18	1" TO 1 1/2" BAR, OR 1" TO 1 1/2" EXTRA STRENGTH PIPE
21 TO 25.5	24	18	2" BAR OR 2" EXTRA STRENGTH PIPE
> 26	30	18	3" BAR OR 3" EXTRA STRENGTH PIPE

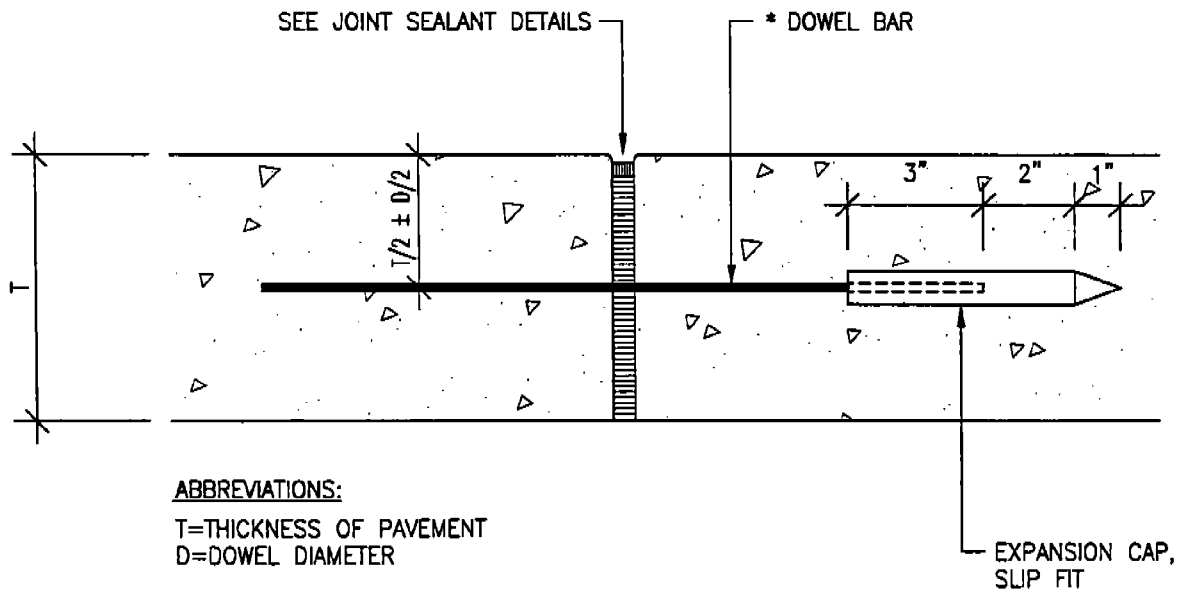
\* PAINT AND OIL ONE END OF DOWEL IF SMOOTH

\*\* REINFORCED CONCRETE SIMILAR

CONTRACTION JOINT FOR PLAIN CONCRETE PAVEMENTS \*\*

SCALE:  
3"=1'-0"

## TRANSVERSE



DOWEL BAR SCHEDULE			
PAVEMENT THICKNESS (INCHES)	MINIMUM DOWEL LENGTH (INCHES)	MAXIMUM DOWEL SPACING (INCHES)	DOWEL DIAMETER AND TYPE
< 8	16	12	3/4" BAR
8.5 TO 11.5	16	12	1" BAR
12 TO 15.5	20	15	1" TO 1 1/4" BAR, OR 1" EXTRA STRENGTH PIPE
16 TO 20.5	20	18	1" TO 1 1/2" BAR, OR 1" TO 1 1/2" EXTRA STRENGTH PIPE
21 TO 25.5	24	18	2" BAR OR 2" EXTRA STRENGTH PIPE
> 26	30	18	3" BAR OR 3" EXTRA STRENGTH PIPE

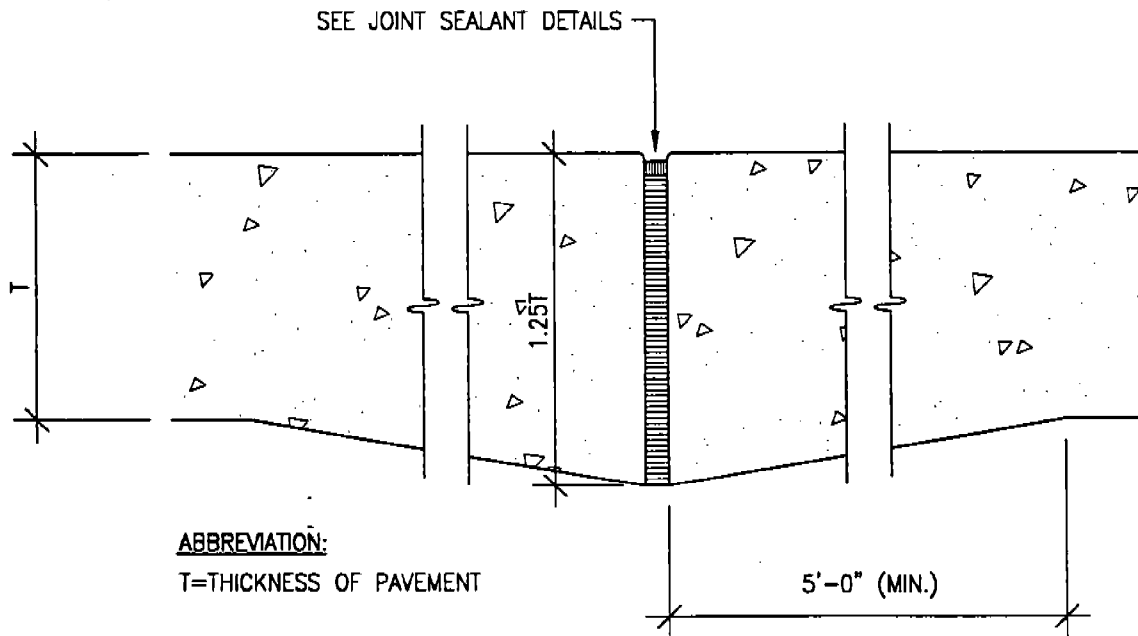
\* PAINT AND OIL ONE END OF DOWEL

\*\* REINFORCED CONCRETE SIMILAR

EXPANSION JOINT FOR PLAIN CONCRETE PAVEMENTS \*\*

SCALE:  
3"=1'-0"

LONGITUDINAL

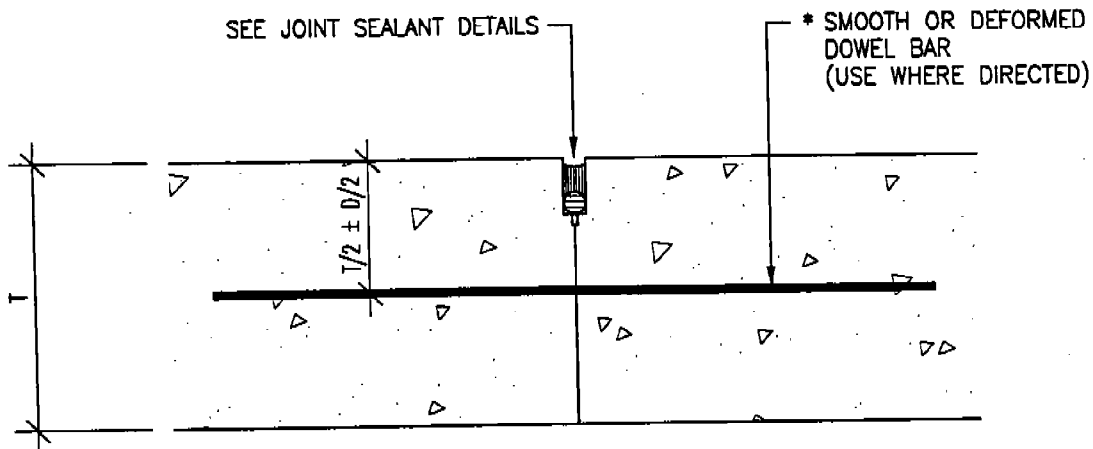


\* REINFORCED CONCRETE  
SIMILAR

EXPANSION JOINT FOR PLAIN CONCRETE PAVEMENTS \*

SCALE:  
3"=1'-0"

## DOWELED TRANSVERSE OR LONGITUDINAL



### ABBREVIATIONS:

T=THICKNESS OF PAVEMENT  
D=DOWEL DIAMETER

DOWEL BAR SCHEDULE			
PAVEMENT THICKNESS (INCHES)	MINIMUM DOWEL LENGTH (INCHES)	MAXIMUM DOWEL SPACING (INCHES)	DOWEL DIAMETER AND TYPE
< 8	16	12	3/4" BAR
8.5 TO 11.5	16	12	1" BAR
12 TO 15.5	20	15	1" TO 1 1/4" BAR, OR 1" EXTRA STRENGTH PIPE
16 TO 20.5	20	18	1" TO 1 1/2" BAR, OR 1" TO 1 1/2" EXTRA STRENGTH PIPE
21 TO 25.5	24	18	2" BAR OR 2" EXTRA STRENGTH PIPE
> 26	30	18	3" BAR OR 3" EXTRA STRENGTH PIPE

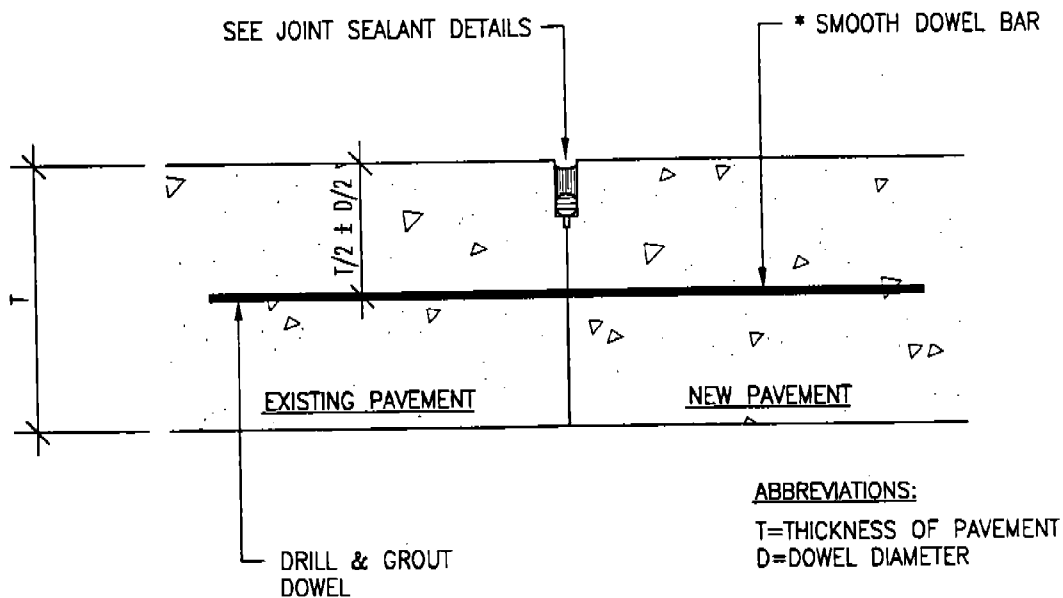
\* PAINT AND OIL ONE END OF DOWEL IF SMOOTH

\*\* REINFORCED CONCRETE SIMILAR

CONSTRUCTION JOINT FOR PLAIN CONCRETE PAVEMENTS \*\*

SCALE:  
3"=1'-0"

## DOWELED TRANSVERSE OR LONGITUDINAL



### ABBREVIATIONS:

T=THICKNESS OF PAVEMENT  
D=DOWEL DIAMETER

DOWEL BAR SCHEDULE			
PAVEMENT THICKNESS (INCHES)	MINIMUM DOWEL LENGTH (INCHES)	MAXIMUM DOWEL SPACING (INCHES)	DOWEL DIAMETER AND TYPE
< 8	16	12	3/4" BAR
8.5 TO 11.5	16	12	1" BAR
12 TO 15.5	20	15	1" TO 1 1/4" BAR, OR 1" EXTRA STRENGTH PIPE
16 TO 20.5	20	18	1" TO 1 1/2" BAR, OR 1" TO 1 1/2" EXTRA STRENGTH PIPE
21 TO 25.5	24	18	2" BAR OR 2" EXTRA STRENGTH PIPE
> 26	30	18	3" BAR OR 3" EXTRA STRENGTH PIPE

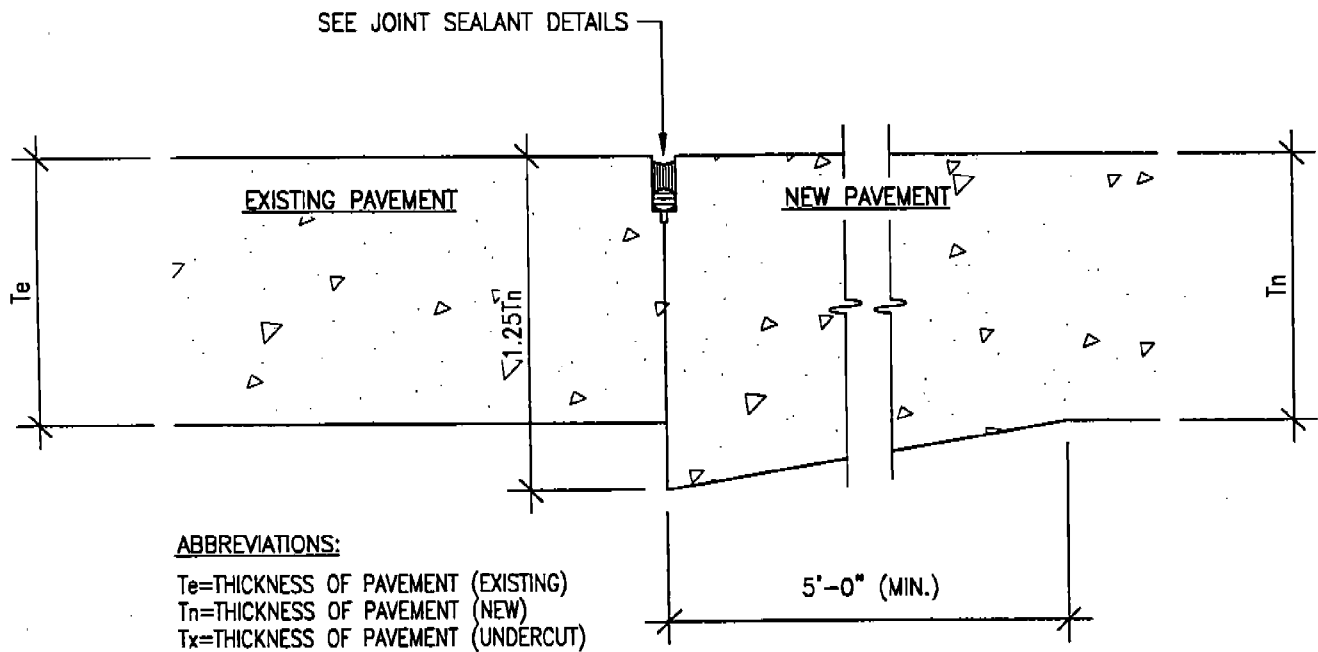
\* PAINT AND OIL ONE END OF DOWEL

\*\* REINFORCED CONCRETE SIMILAR

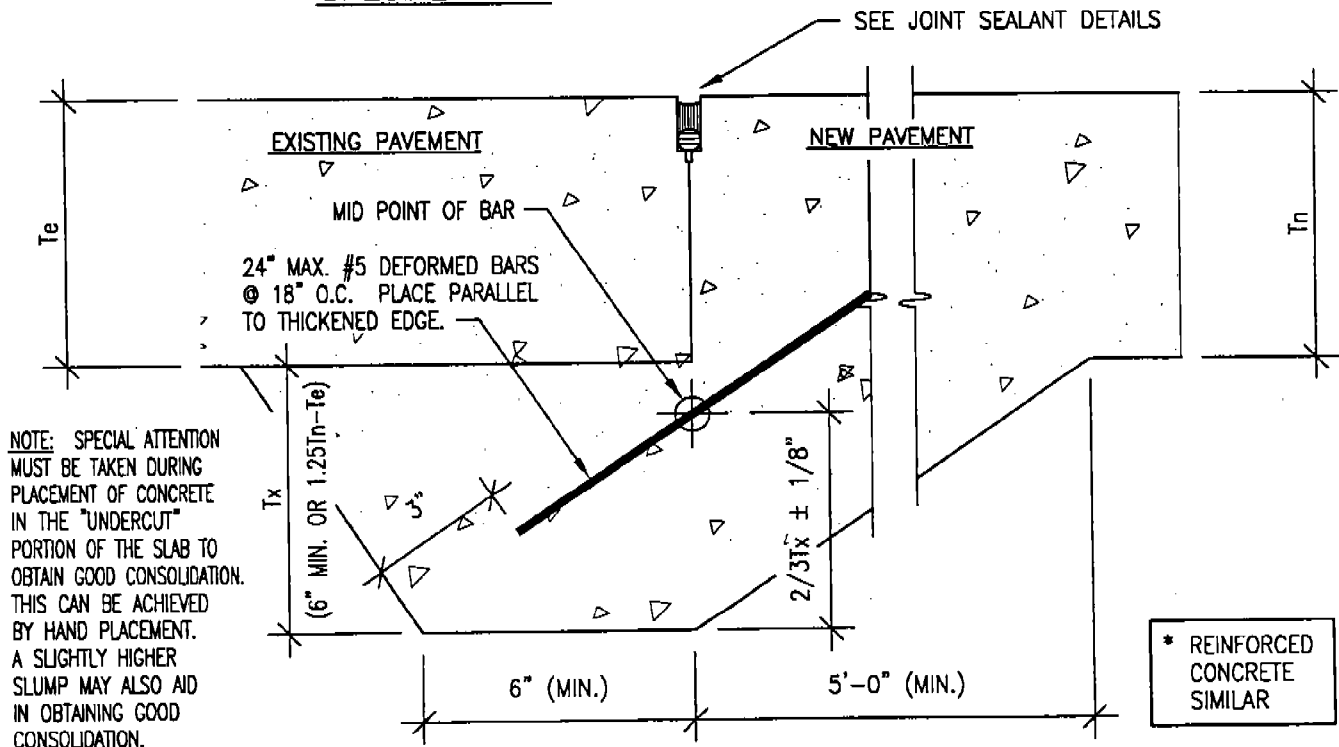
CONSTRUCTION JOINT FOR PLAIN CONCRETE PAVEMENTS  
BETWEEN NEW AND EXISTING PAVEMENTS \*\*

SCALE:  
3"=1'-0"

## THICKENED EDGE



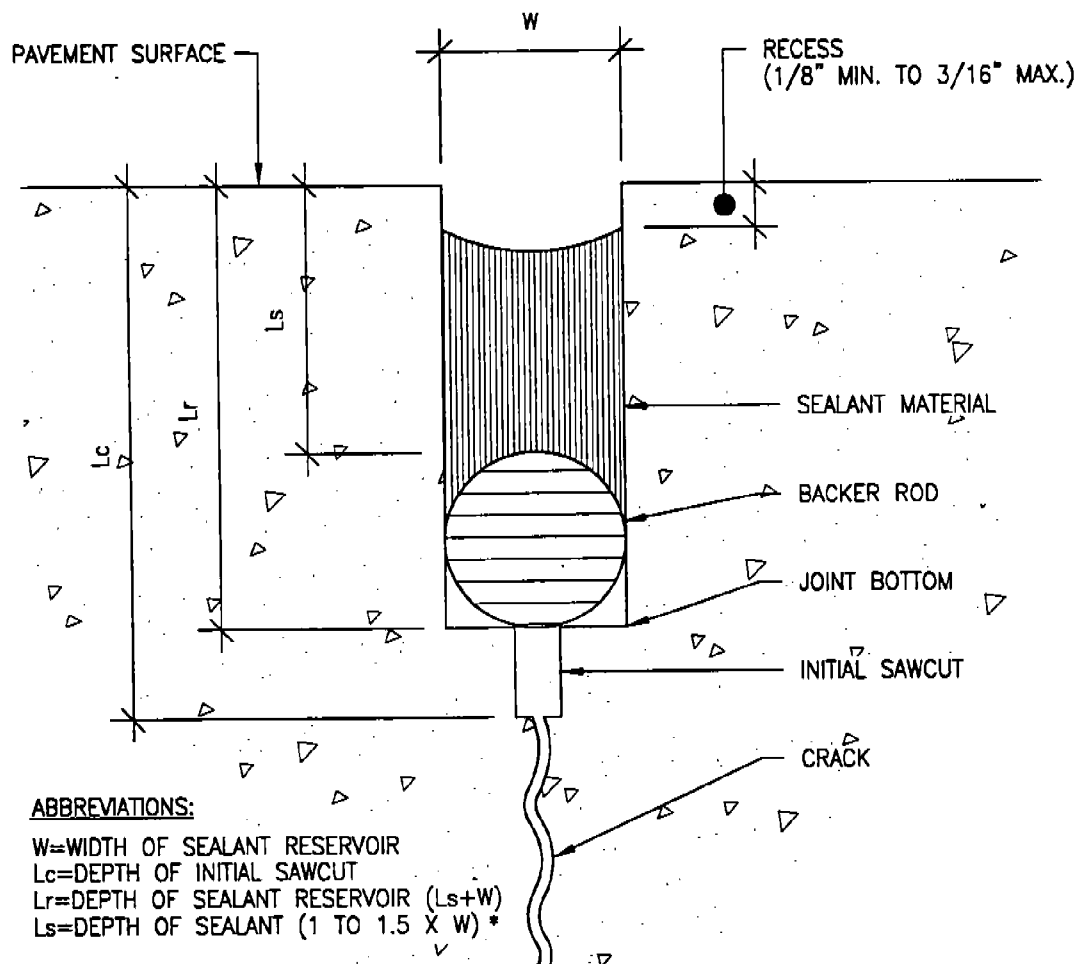
## SPECIAL JOINT



CONSTRUCTION JOINT FOR PLAIN CONCRETE PAVEMENTS  
BETWEEN NEW AND EXISTING PAVEMENTS \*

SCALE:  
3"=1'-0"





SAWCUT DEPTH SCHEDULE ( $L_c$ )	
PAVEMENT THICKNESS (INCHES)	DEPTH OF INITIAL CUT
< 12	1/4 SLAB THICKNESS
12 TO 18	3"
> 18	1/6 SLAB THICKNESS

WIDTH OF RESERVOIR SCHEDULE (W)		
JOINT SPACING (FEET)	WIDTH OF RESERVOIR	
	MINIMUM	MAXIMUM
< 25	1/2"	5/8"
25 TO 50	3/4"	7/8"
> 50	1"	1 1/8"

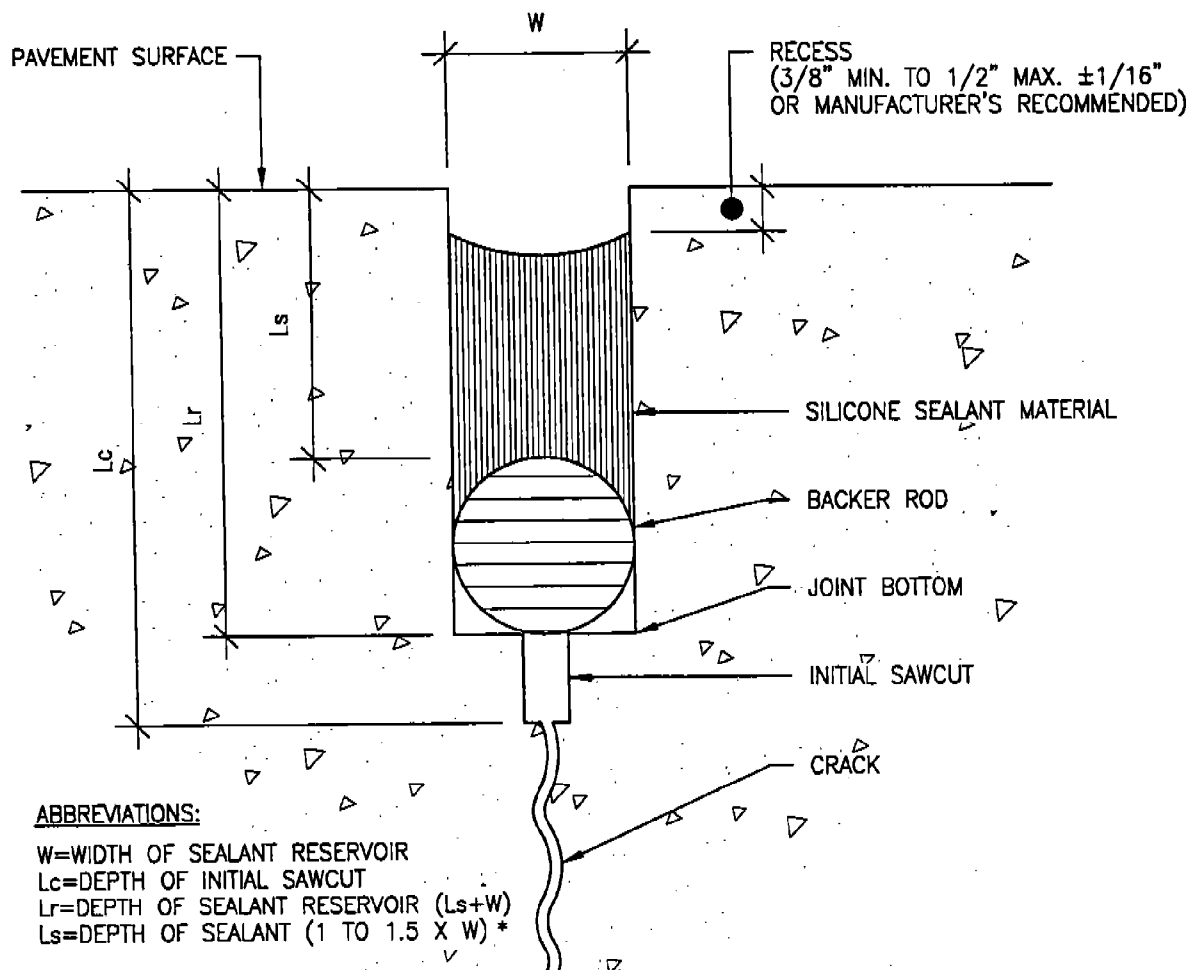
**NOTE:**

NONABSORBENT BACKER ROD REQUIRED TO PREVENT SEALANT FROM FLOWING INTO SAWCUT, TO SEPARATE NONCOMPATIBLE MATERIALS AND PREVENT JOINT SEALANT FROM BONDING TO BOTTOM OF RESERVOIR.

\* FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR SILICONE SEALANT

## JOINT SEALANT DETAILS--CONTRACTION JOINTS

SCALE:  
1"=2"



SAWCUT DEPTH SCHEDULE ( $L_c$ )	
PAVEMENT THICKNESS (INCHES)	DEPTH OF INITIAL CUT
< 12	1/4 SLAB THICKNESS
12 TO 18	3"
> 18	1/6 SLAB THICKNESS

SEALANT & RESERVOIR SCHEDULE ( $L_r$ & $L_s$ )		
W	$L_r$	$L_s$
1/2"	1 3/8"	1/4"
5/8"	1 5/8"	5/16"
3/4"	1 7/8"	3/8"
7/8"	2"	7/16"
1"	2 1/8"	1/2"
> 1"	> 2 1/8"	1/2"

WIDTH OF RESERVOIR SCHEDULE (W)		
JOINT SPACING (FEET)	WIDTH OF RESERVOIR	
	MINIMUM	MAXIMUM
< 25	1/2"	5/8"
25 TO 50	3/4"	7/8"
> 50	1"	1 1/8"

NOTE:  
NONABSORBENT BACKER ROD REQUIRED TO PREVENT SEALANT FROM FLOWING INTO SAWCUT, TO SEPARATE NONCOMPATIBLE MATERIALS AND PREVENT JOINT SEALANT FROM BONDING TO BOTTOM OF RESERVOIR.

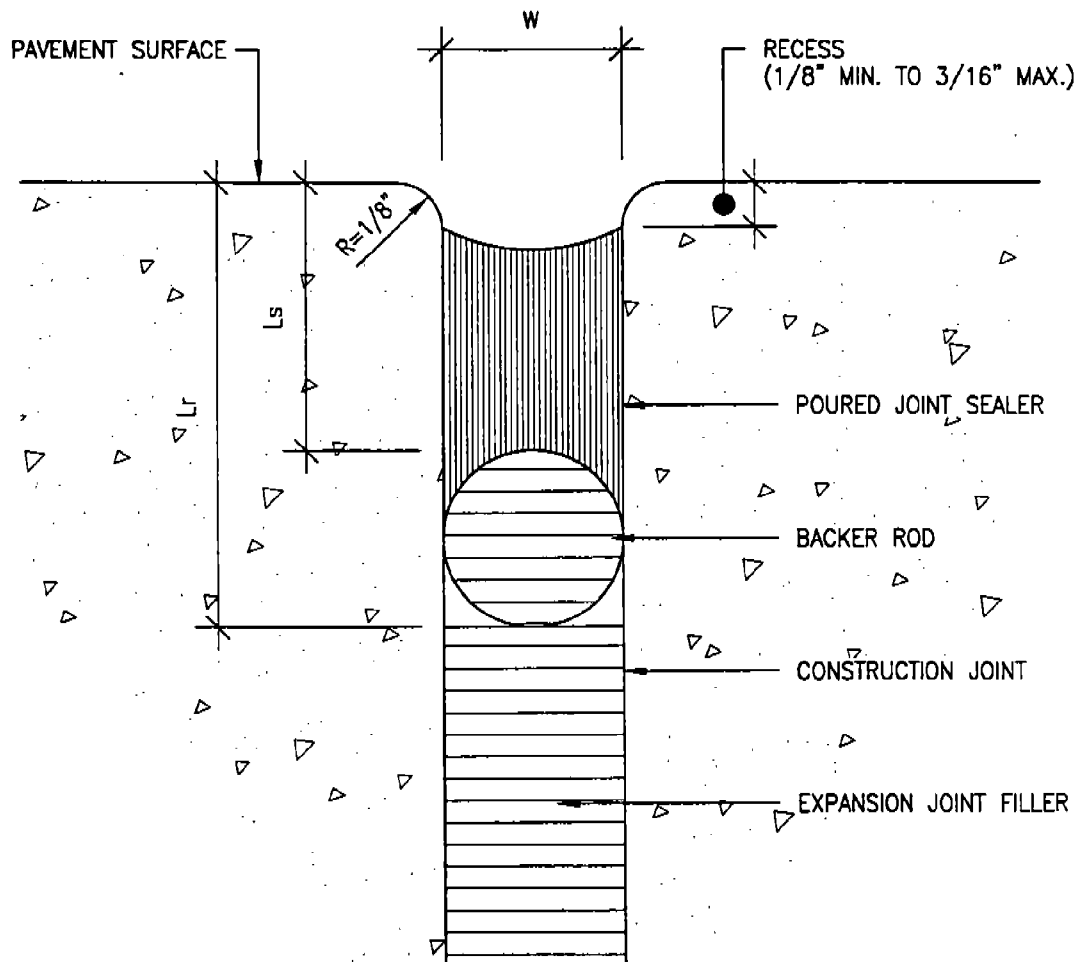
\* FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR SILICONE SEALANT

### CONTRACTION JOINT USING SILICONE SEALANT

(NOTE: EXPANSION & CONSTRUCTION JOINTS SIMILAR)

JOINT SEALANT DETAILS--CONTRACTION JOINTS W/SILICONE

SCALE:  
1"=2"



**ABBREVIATIONS:**

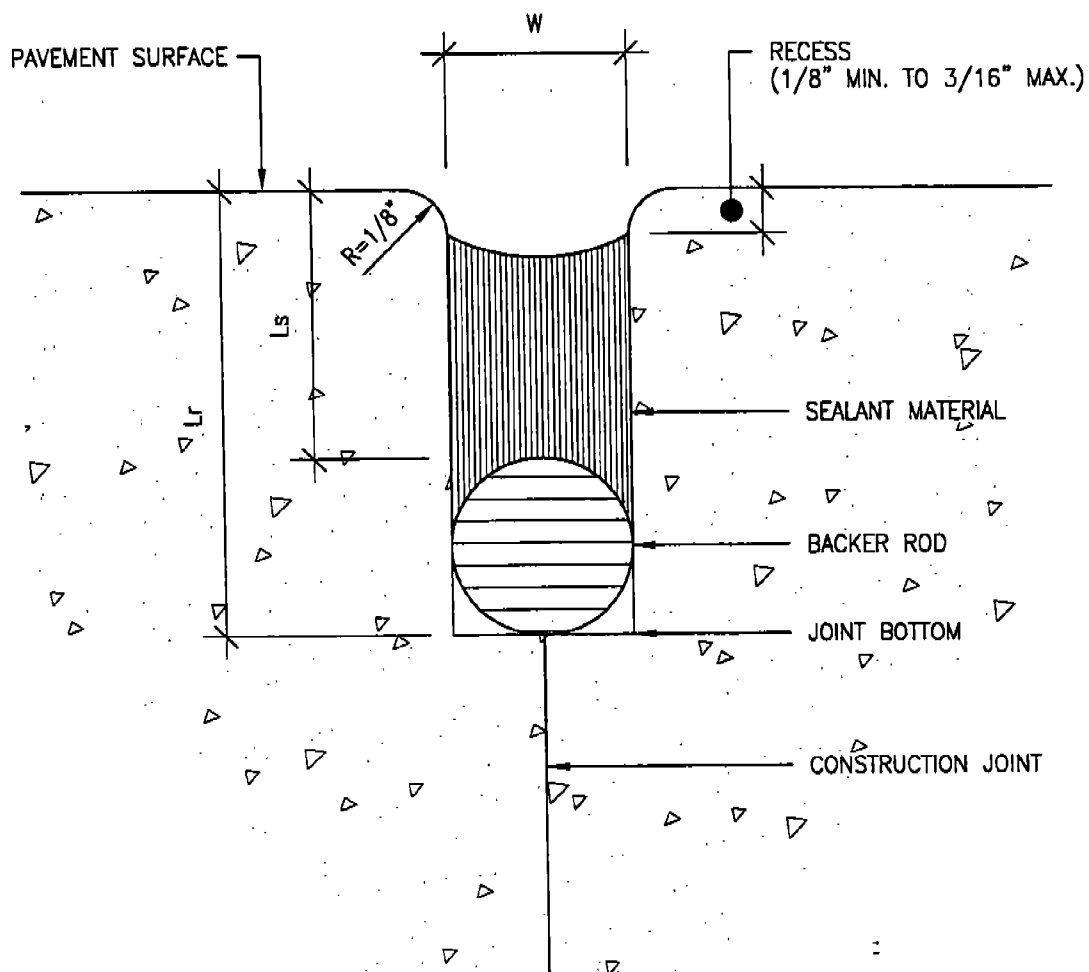
W=WIDTH OF SEALANT RESERVOIR  
 Lr=DEPTH OF SEALANT RESERVOIR ( $L_s + W$ )  
 Ls=DEPTH OF SEALANT ( $1 \text{ TO } 1.5 \times W$ ) \*

WIDTH OF RESERVOIR SCHEDULE (W)		
JOINT SPACING (FEET)	WIDTH OF RESERVOIR	
	MINIMUM	MAXIMUM
< 25	1/2"	5/8"
25 TO 50	3/4"	7/8"
> 50	1"	1 1/8"

\* FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR SILICONE SEALANT

**JOINT SEALANT DETAILS--EXPANSION JOINTS**

**SCALE:**  
 1"=2"



**ABBREVIATIONS:**

W=WIDTH OF SEALANT RESERVOIR  
 Lr=DEPTH OF SEALANT RESERVOIR (Ls+W)  
 Ls=DEPTH OF SEALANT (1 TO 1.5 X W) \*

WIDTH OF RESERVOIR SCHEDULE (W)		
JOINT SPACING (FEET)	WIDTH OF RESERVOIR	
	MINIMUM	MAXIMUM
< 25	1/2"	5/8"
25 TO 50	3/4"	7/8"
> 50	1"	1 1/8"

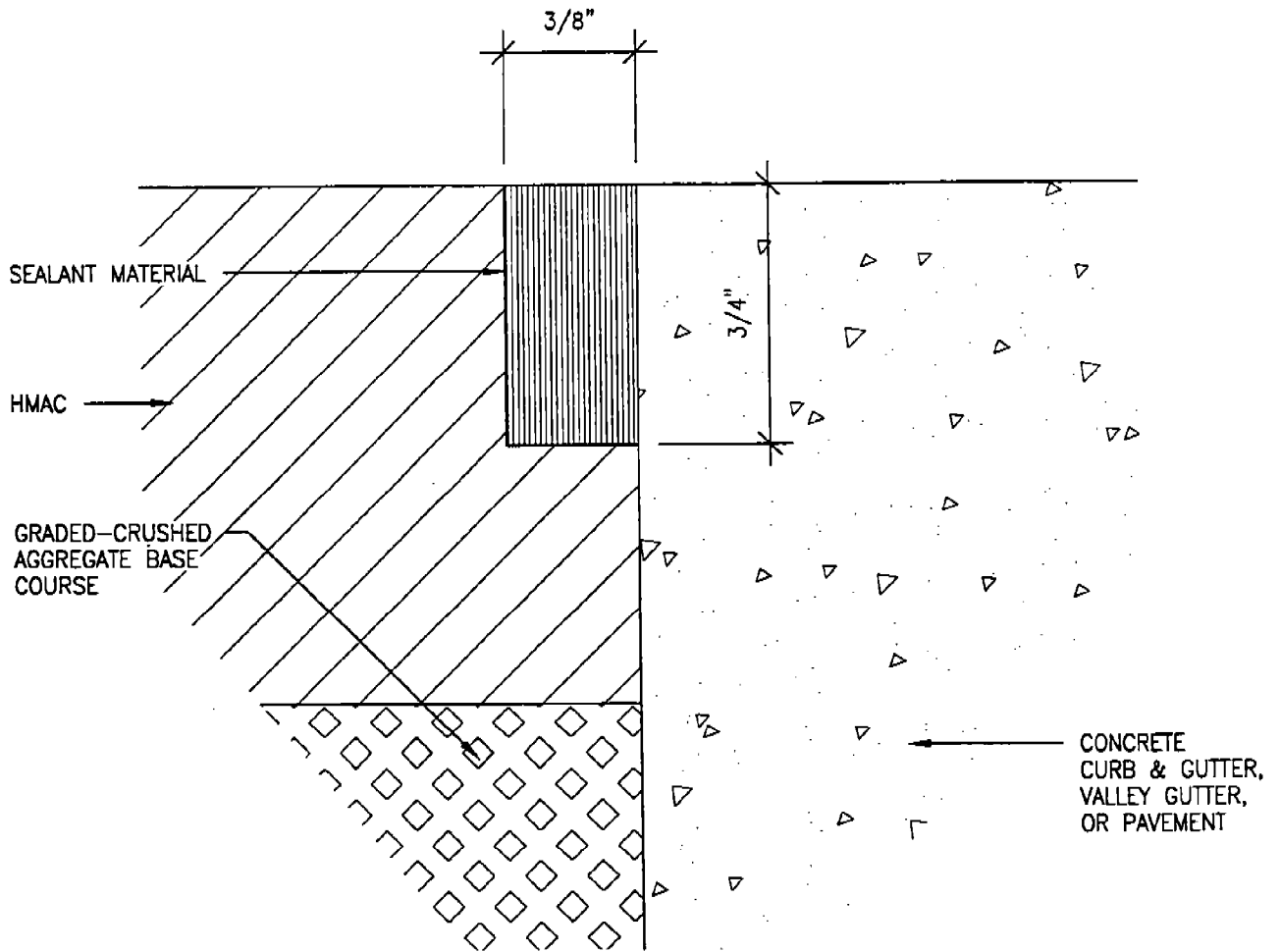
**NOTE:**

NONABSORBENT BACKER ROD REQUIRED TO PREVENT SEALANT FROM FLOWING INTO SAWCUT, TO SEPARATE NONCOMPATIBLE MATERIALS AND PREVENT JOINT SEALANT FROM BONDING TO BOTTOM OF RESERVOIR.

\* FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR SILICONE SEALANT

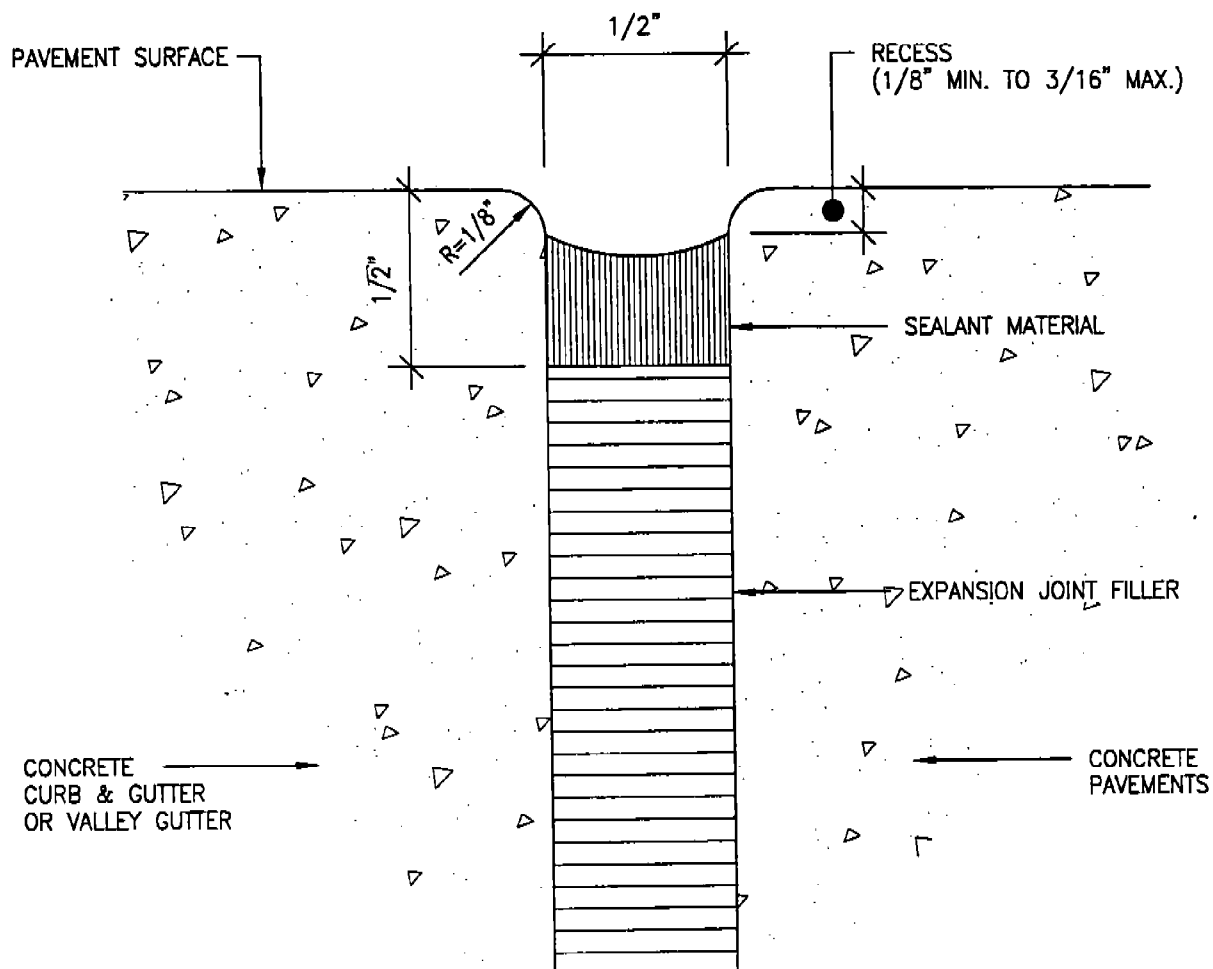
**JOINT SEALANT DETAILS--CONSTRUCTION JOINTS**

**SCALE:**  
 1"=2"



JOINT SEALANT DETAILS--DETAIL "A"

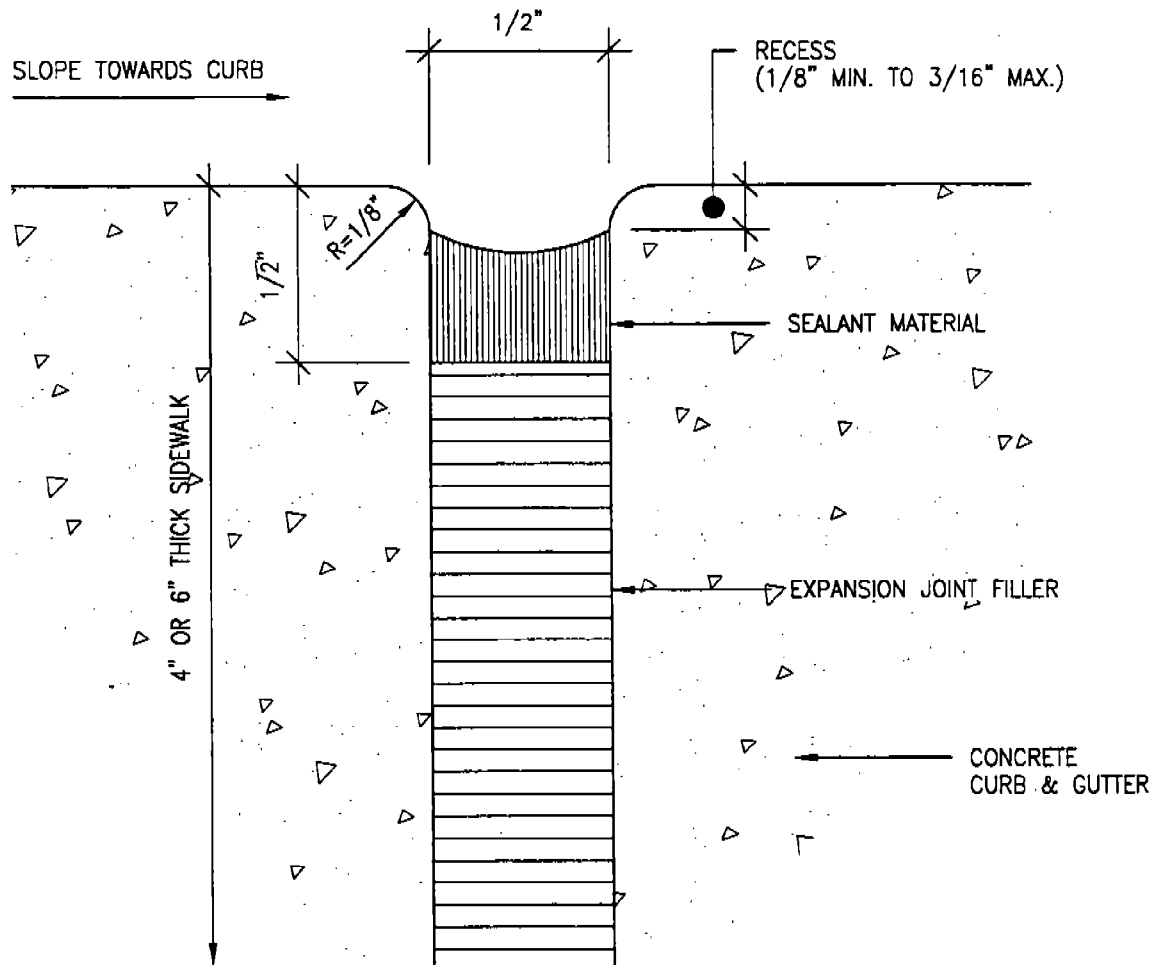
SCALE:  
1"=2"



NOTE: USE DETAIL "B" IN FLOW LINE ONLY, NOT IN THE TOP OF CURB.

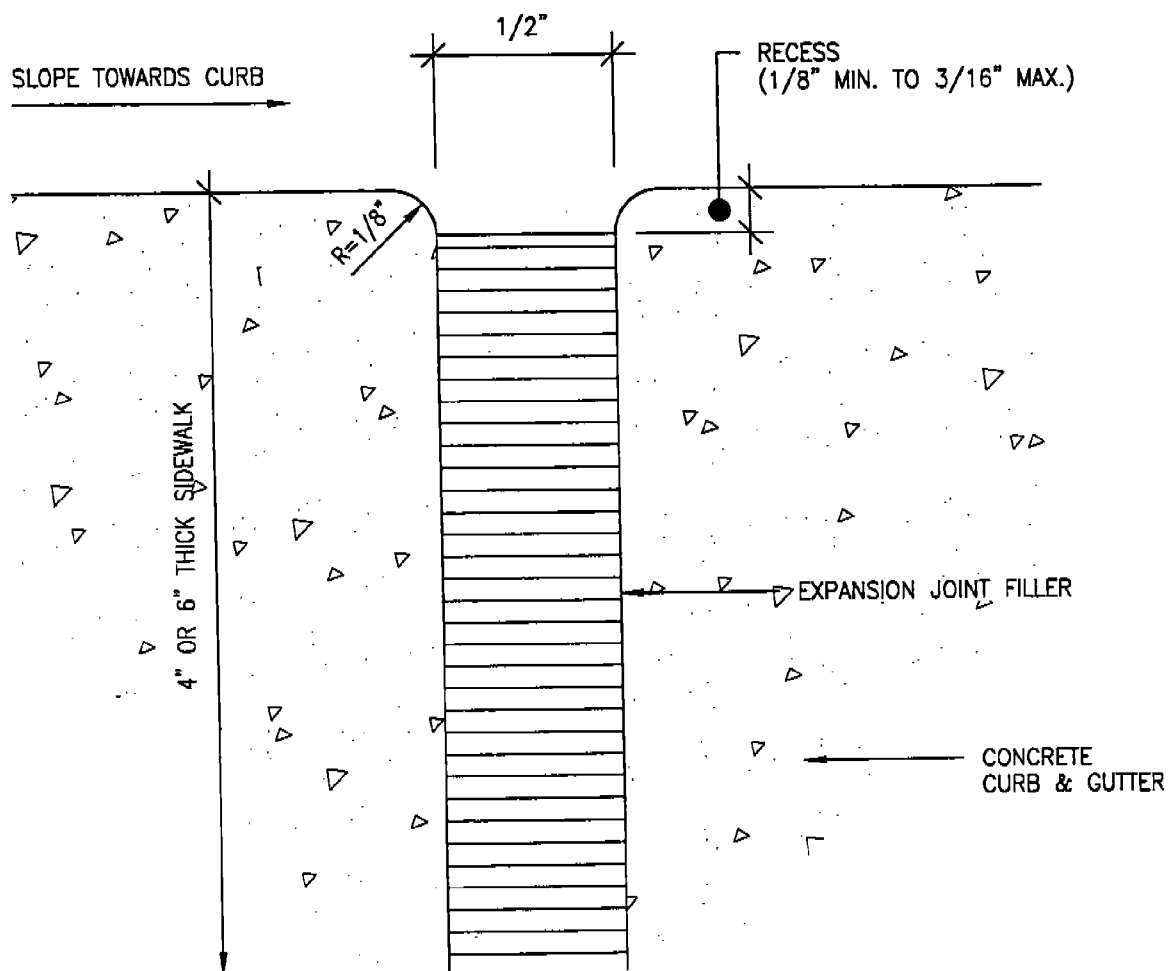
# JOINT SEALANT DETAILS--DETAIL "B"

SCALE:  
1"=2"



JOINT SEALANT DETAILS--DETAIL "C"

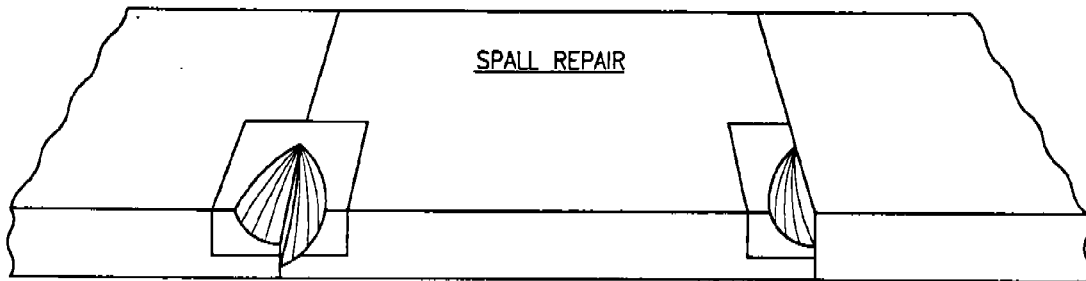
SCALE:  
1"=2"



JOINT SEALANT DETAILS--DETAIL "D"

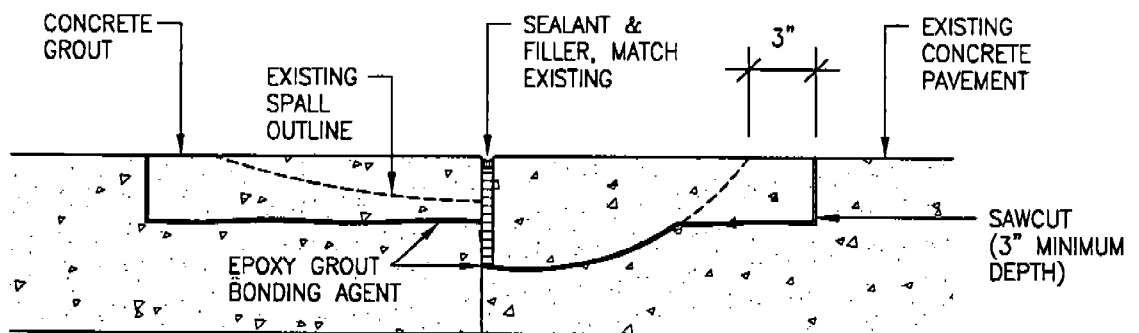
SCALE:  
1"=2"



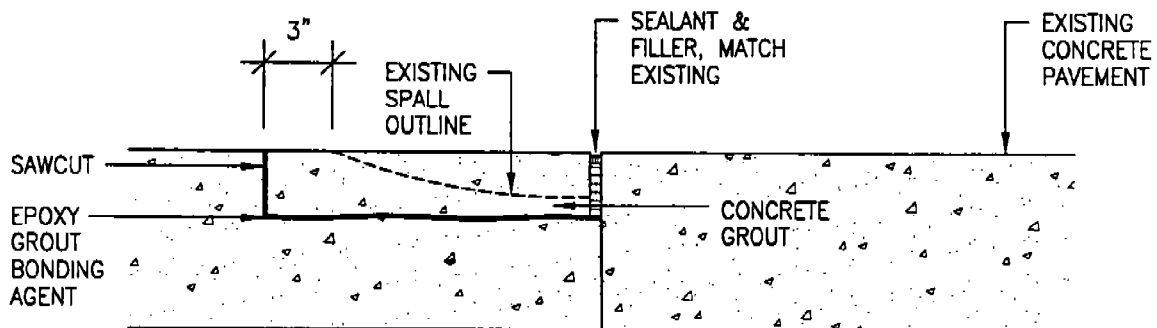


SPALL CROSSING EXISTING JOINT

SPALL TO THE SIDE OF EXISTING JOINT



SPALL CROSSING EXISTING JOINT

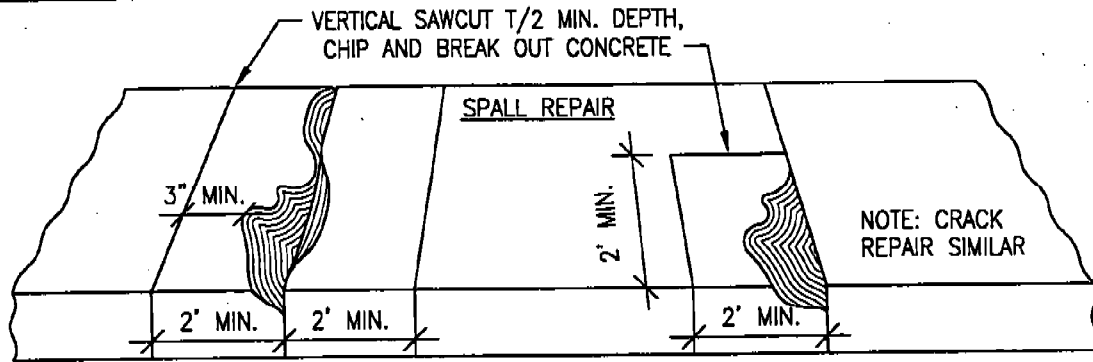


SPALL TO THE SIDE OF EXISTING JOINT

MAKE VERTICAL SAWCUT 2" DEEP, APPROXIMATELY 3" FROM DISTRESSED AREA. REMOVE ALL CONCRETE WITHIN SAWED AREA TO SOUND CONCRETE OR 3" MINIMUM DEPTH. TO MAINTAIN AND PROTECT JOINT, USE A SEPARATING MEDIUM. USE A BONDING AGENT TO INSURE GOOD CONTACT BETWEEN EXISTING PAVEMENT AND PATCH. GROUT AND PATCH WITH 2" SLUMP CONCRETE. AFTER CURING CLEAN JOINT AND APPLY JOINT SEALANT.

REPAIR OF CONCRETE PAVEMENTS--PARTIAL DEPTH REPAIR

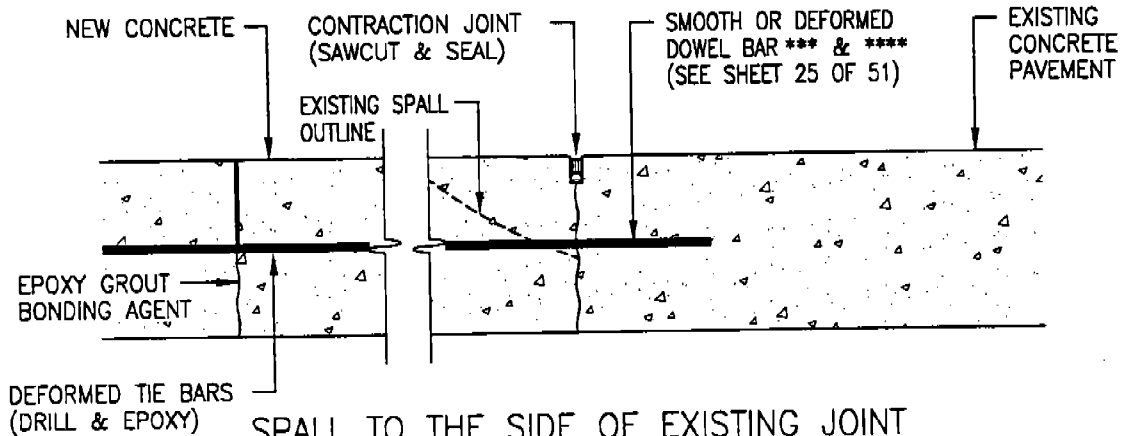
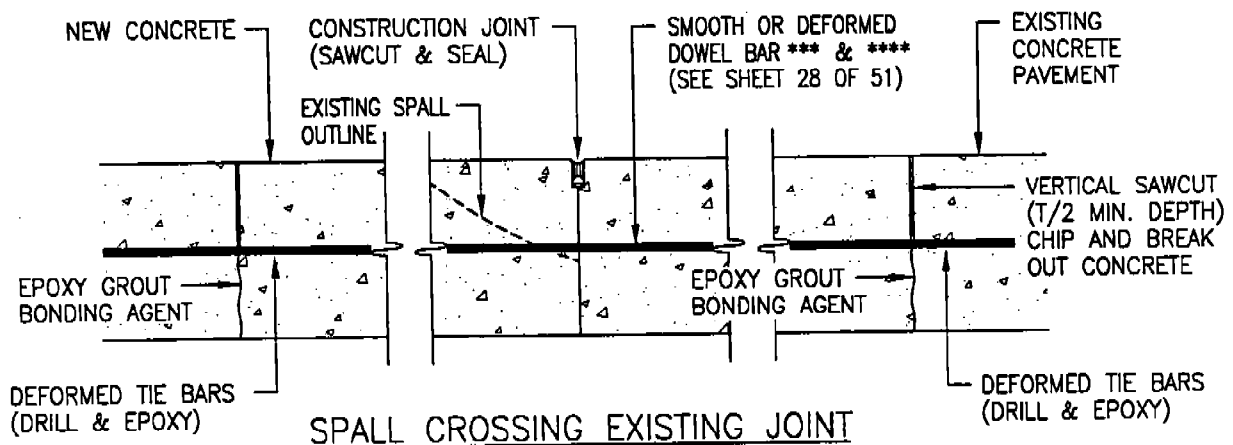
SCALE:  
1 1/2"=1'-0"



\* SPALL CROSSING EXISTING JOINT

SPALL TO THE SIDE OF EXISTING JOINT

\*\* (NOTE: LONGITUDINAL JOINTS ARE NOT SHOWN)



\* FORM AND/OR PLACE CONCRETE ON EACH SIDE OF JOINT SEPARATELY

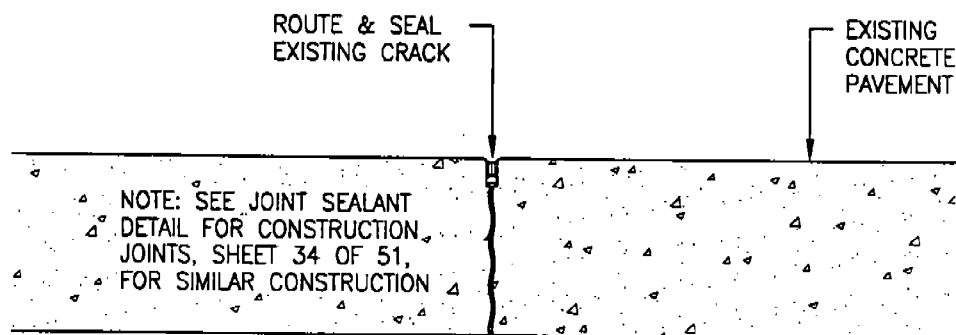
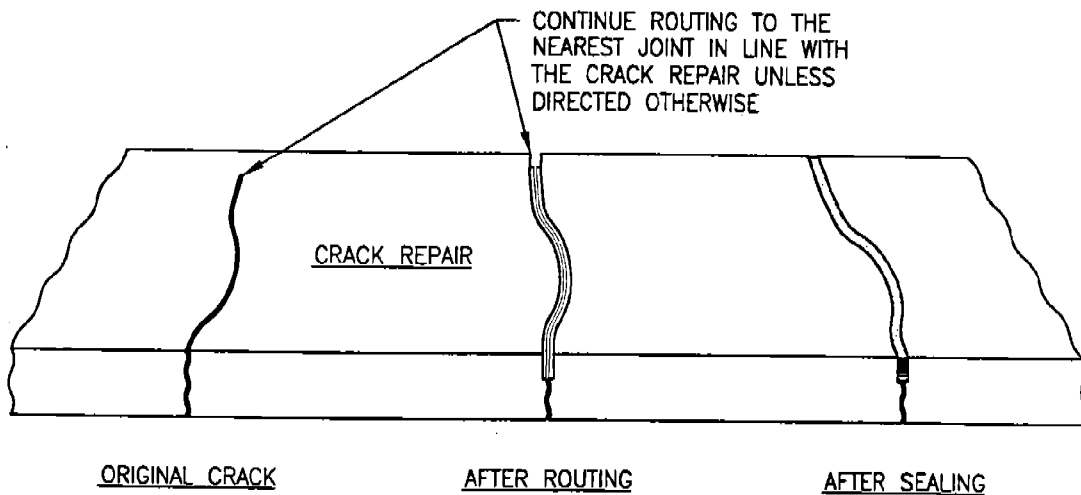
\*\* RE-ESTABLISH LONGITUDINAL CONSTRUCTION JOINT. MATCH EXISTING KEY AND/OR DOWELS

\*\*\* RE-ESTABLISH CONSTRUCTION OR CONTRACTION JOINT. MATCH EXISTING KEY AND/OR DOWELS. AT CONTRACTION JOINTS, DOWEL IF REPAIR IS 1/3 OR MORE OF SLAB WIDTH.

\*\*\*\* PAINT AND OIL ONE END OF DOWEL IF SMOOTH

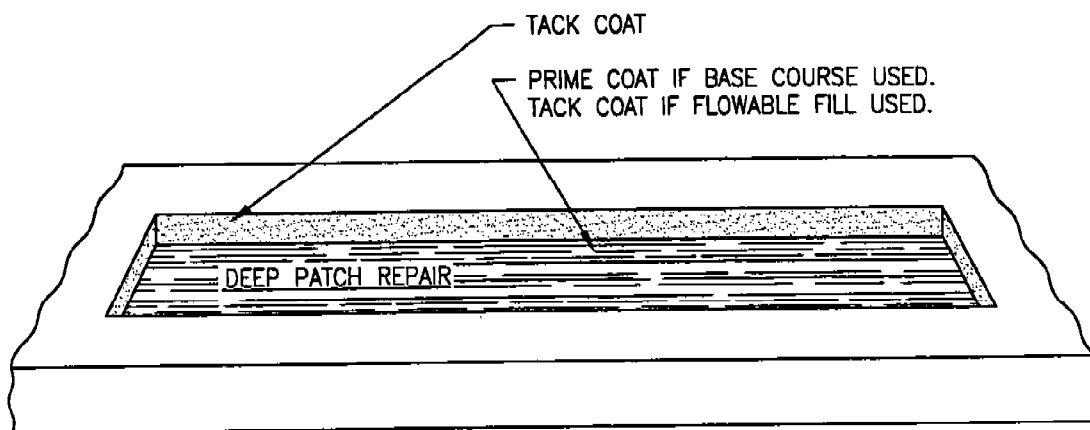
REPAIR OF CONCRETE PAVEMENTS--FULL DEPTH REPAIR

SCALE:  
1 1/2"=1'-0"



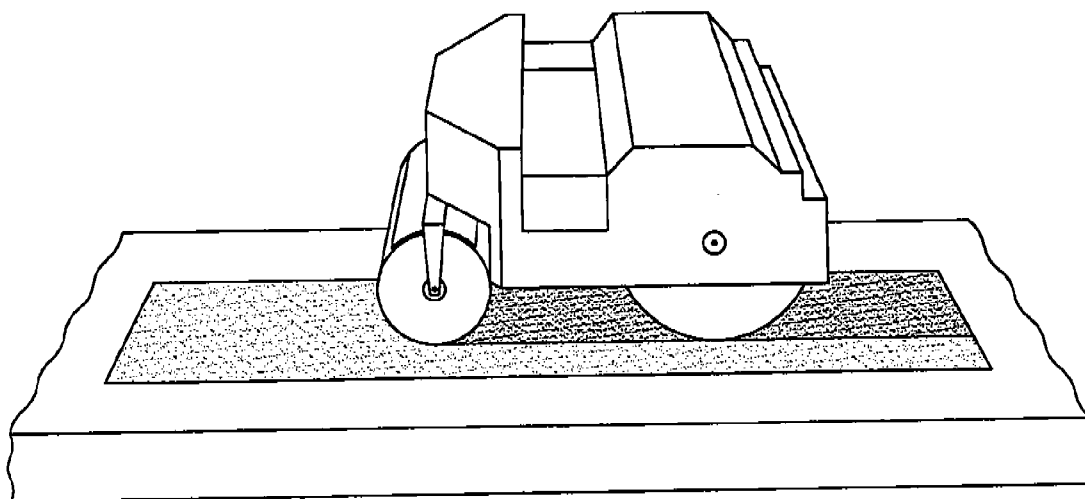
# REPAIR OF CONCRETE PAVEMENTS--CRACK REPAIR

SCALE:  
1 1/2"=1'-0"



#### PREPARATIONS:

1. REMOVE SURFACE AND BASE AS NECESSARY TO FIRM MATERIAL AND COMPACT.
2. CUT STRAIGHT & VERTICAL FACES WITH PAVEMENT SAW.
3. INSTALL NEW COMPACTED BASE OR FLOWABLE FILL.
4. APPLY PRIME COAT OR TACK COAT TO HORIZONTAL SURFACES.

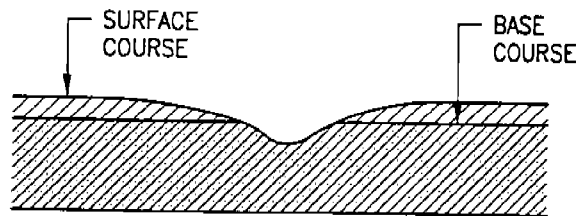


#### REPAIRS:

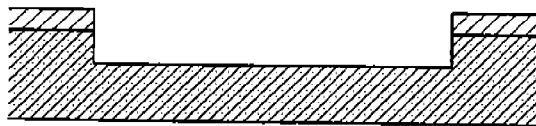
1. BACKFILL AND COMPACT USING HOT ASPHALT MIX.
2. USE VIBRATORY PLATE COMPACTOR FOR SMALL PATCHES.
3. USE ROLLER COMPACTOR FOR LARGE PATCHES.
4. COMPACT TO SAME GRADE AS SURROUNDING PAVEMENT AND MEET DENSITY REQUIREMENTS.
5. MAXIMUM THICKNESS OF COMPACTED LIFT = 2 1/2".

REPAIR OF FLEXIBLE PAVEMENTS--DEEP PATCH REPAIR

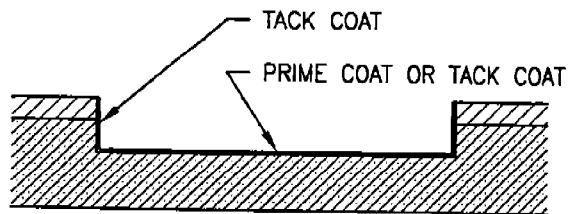
SCALE:  
NOT TO SCALE



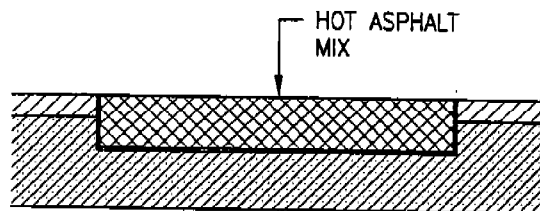
POTHOLE SECTION



STEP 1: TRIM VERTICAL SIDES TO FIRM MATERIAL AND COMPACT. ADD FLOWABLE FILL AS NECESSARY OR AS DIRECTED.



STEP 2: TACK COAT SIDES AND PRIME COAT BOTTOM OF PATCH.



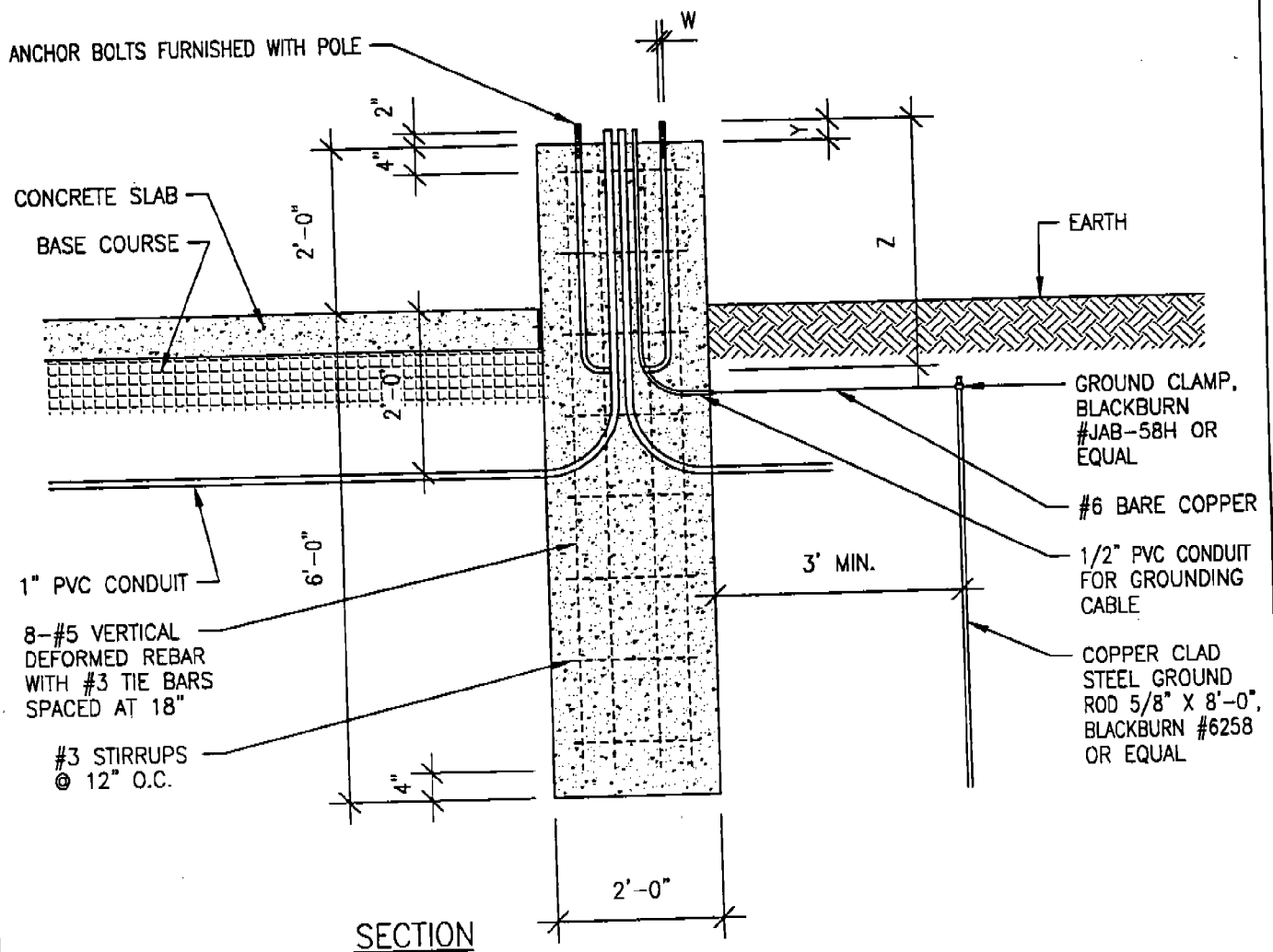
STEP 3: PLACE HOT ASPHALT MIX IN LAYERS NOT TO EXCEED 2 1/2". COMPACT AND LEVEL TO SPECIFIED GRADE AND DENSITY.

## REPAIR OF FLEXIBLE PAVEMENTS--POTHOLE REPAIR

SCALE:  
3/4"=1'-0"

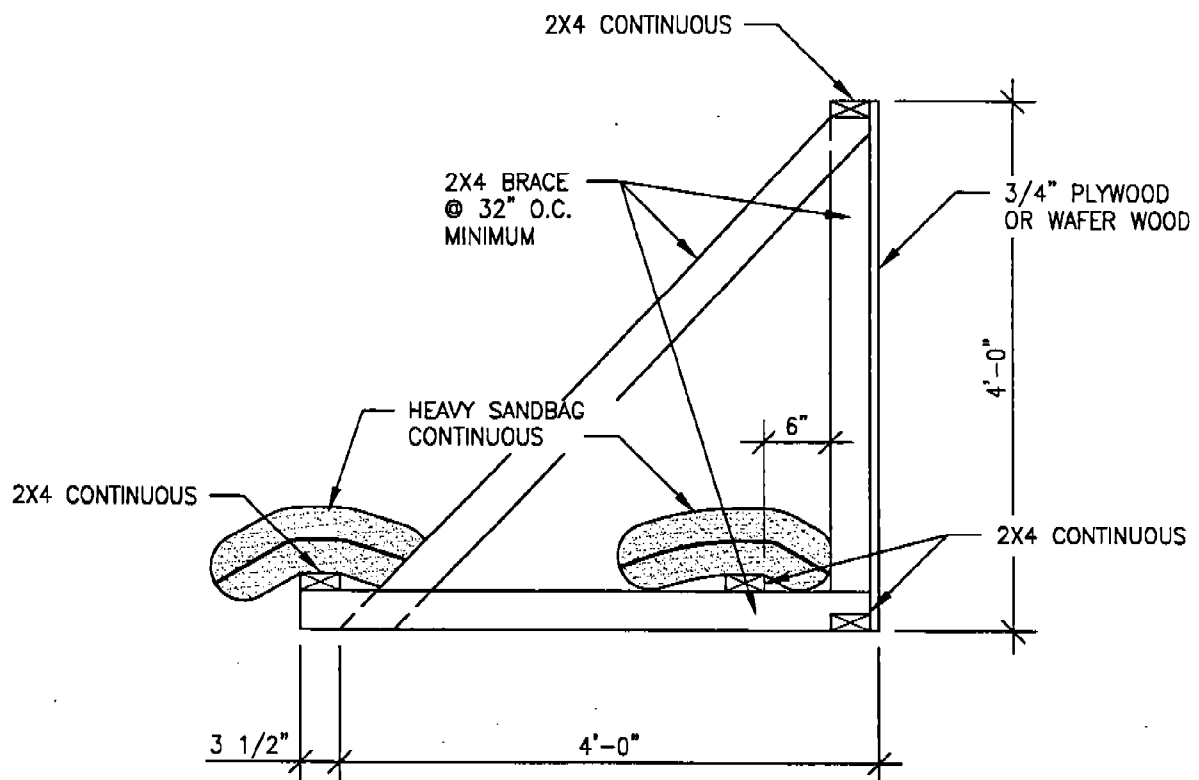
**NOTES:**

1. DIMENSIONS "W", "X", "Y" & "Z" SHALL BE SPECIFIED BY THE POLE MANUFACTURER.
2. USE MINIMUM 3000 P.S.I. CONCRETE.
3. FOUNDATION SHALL BE 24" DIAMETER.



MISCELLANEOUS DETAIL--LIGHT POLE FOUNDATION

SCALE:  
1/2"=1'-0"



MISCELLANEOUS DETAIL--FOD BARRIER

SCALE:  
3/4"=1'-0"